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Indiana's Forests in 1998

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This report includes the most commonly used U.S. Department of Agriculture, Forest Service, Forest Inventory and Analysis (FIA) statistics. Additional forest resource data can be obtained through FIA staff, the use of a FIA CD-ROM disc, or through a table generator on the North Central Research Station's Internet page. Persons requesting additional information from FIA staff are expected to pay the retrieval costs. Requests may be directed to:

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FOREWORD

FIA is a continuing endeavor as mandated by the Renewable Resources Research Act of 1978, the Forest Ecosystems and Atmospheric Pollution Act of 1988, and Section 253(c) of the Agricultural Research, Extension, and Education Reform Act of 1998. The objective of FIA is to inventory the Nation's forest land. Up-to-date resource information is essential to frame forest policies and programs. USDA Forest Service regional research stations are responsible for conducting these inventories. Fieldwork for the fourth forest inventory of Indiana was begun in August of 1996 and completed in August of 1998. Reports of previous inventories of Indiana are dated 1950, 1967, and 1986. The State of Indiana provided valuable cooperation and assistance throughout the course of this most recent inventory effort.

Notice to users of the 1998 inventory of Indiana's forest resources results:

Tables in the Appendix relating to sawtimber volume are presented in both International 1/4-inch rule and Doyle rule. International 1/4-inch rule is the USDA Forest Service standard while Doyle rule is the common measure used in Indiana by forest industries and land management agencies. Because these results are used nationally and consistent comparisons are crucial, International 1/4-inch rule is used as the unit of measure for sawtimber volume unless Doyle rule is noted in the text. The authors have made an effort to include Doyle tables and discussion where appropriate to improve the utility of the inventory results for regional and local users of these results.

Data from new inventories are often compared with data from earlier inventories to determine trends in forest resources. However, for the comparisons to be valid, the procedures used in the two inventories must be similar. As a result of our ongoing efforts to improve the efficiency and reliability of the inventory, several changes in procedures and definitions have occurred since the last Indiana inventory in 1986. Because some of these changes will make it inappropriate to directly compare the 1998 data with those published for 1986, data from the 1986 inventory have been reprocessed using the 1998 procedures. Please refer to the section labeled "Comparing the Fourth Inventory of Indiana with the Third Inventory" in the Appendix for more details.

Perhaps the most significant change between inventories was the development of new volume tables between the 1986 and 1998 inventories of Indiana's forest resources. The new volume tables, developed by USDA Forest Service research scientists and other cooperating researchers, more accurately estimate the true growing-stock and sawtimber volume. In general, the old volume tables used in the previous inventories slightly overestimated the true volume. As a part of the current inventory, we updated the 1986 inventory using the new volume tables. As a result, the volumes that were recalculated for the 1986 inventory show a small decrease from the previously published volumes (Resource Bulletins NC-108 – Indiana Forest Statistics, 1986; and NC-113 – Indiana's Timber Resource, 1986: An Analysis). All tables with 1986 data, and comparisons to the 1986 inventory results, in this publication reflect the recalculated volumes.

Field work for this most recent inventory was completed between 1996 and 1998. All data related to area and volume are dated 1998. Because field measurements were ongoing during 1998 and change data such as growth, mortality, and removals continued to occur in 1998, these data are dated

1997. Comparisons between the most recent inventory and updated previous inventories for area and volume compare 1986 with 1998. Comparisons for growth, mortality, and removals compare 1986 with 1997.

FIA staff located in St. Paul, Minnesota, involved in the fourth inventory of Indiana included Beth Collins, Dave Frazier, Barb Freund, Dale Gormanson, Ron Hackett, David Haugen, Neal Kingsley, Barb Knight, Leo Larkin, Earl Leatherberry, Troy Lindgren, Dennis May, Pat Miles, Tim Miller, Jerry Ostrom, Ron Piva, Gerhard Raile, Mary Jo Resendez, Tyson Schreiner, Jay Solomakos, and Dan Wendt. FIA field staff involved in this inventory were John Benaszeski, Jody Buffman, Sterling Griffin, Hal Kaina, Peter Koehler, Scott Lancaster, Mark Majewsky, Rebecca Mouw, Paul Perdew, Brad Schneck, Gary Stachowicz, James Williams, and Christopher Yonkers.

Staff from the Indiana Department of Natural Resources—Division of Forestry who assisted with field data collection included Angie Burger, Don Carlson, Lenny Farlee, Joey Gallion, Rob McGriff, Steve Marling, Dave Ramey, Don Stump, and Shannon Winks. Jack Siefert, Purdue University, also assisted with field data collection.

Photos used in this publication are courtesy of the Indiana Department of Natural Resources—Division of Forestry.

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Indiana's Forests in 1998

Thomas L. Schmidt, Mark H. Hansen, and James A. Solomakos

Indiana, well known for its high quality hardwood resource, also has a wide variety of forest resources that make significant environmental and economic contributions. Those contributions range from employment and other economic benefits to parallelism outdoor recreation experiences to protection for the State's soil and water resources. To facilitate describing the results of the most recent inventory of Indiana's forest land, the State is divided into four sampling units (fig. 1).

HIGHLIGHTS

- The area of Indiana's forests continued to show a net increase, a trend that began in the 1960's. The primary causes were increases in the width of existing narrow wooded strips and the conversion of cropland and pasture to forest land. These increases were greater than losses from development of forest land for agriculture, urban/suburban expansion, and other uses.

- Net growth exceeded harvest in Indiana. Average annual net growth of growing stock exceeded harvest by a 2.5 to 1 margin between 1986 and 1997. As a result of the expanding resource and growth exceeding harvest, the volume of trees growing in Indiana continued to increase.

- During the 12 years between inventories, an average of 18 million new growing-stock trees were established each year in Indiana. As a result, in 1998 there were 215 million more growing-stock trees than in 1986.

- The future of the forest lies in the hands of individual private landowners. They own three-fourths of the total area of timberland in Indiana.

Thomas L. Schmidt and **Mark H. Hansen** are Research Foresters, and **James A. Solomakos** is a Computer Program Analyst in the Forest Inventory and Analysis Program Unit at the North Central Research Station, St. Paul, Minnesota.

EXTENT OF INDIANA'S FORESTS

- Both the area of forest land and timberland have increased since the 1960's (timberland is a subset of forest land; timberland has minimum productivity capabilities and is not permanently excluded from harvest by legislation or administrative order). Due to the dominance of timberland, the majority of this report presents results related to timberland. Timberland has historically represented more than 95 percent of the total area of forest land in Indiana. For example, of the 4.5 million acres of forest land in 1998, 96 percent were classified as being timberland.

- The area of timberland in Indiana has been steadily increasing since the 1960's. Timberland increased from 3.896 million acres in 1967, to 4.296 million acres in 1986, to 4.342 million acres in 1998 (fig. 2). In 1998, timberland represented 19 percent of the total land area in Indiana.

- The majority of the increase in area of timberland between 1986 and 1998 occurred in the Northern Unit (fig. 3). The Upland Flats Unit slightly increased while the other two units slightly decreased in their area of timberland.

- Perry County, in the Knobs Unit, was again the most heavily forested county with more than 165 thousand acres of timberland.

- In 1998, the Knobs Unit was the most heavily forested with more than 4 out of every 10 acres classified as timberland. Conversely, in the Northern Unit, slightly less than 1 out of every 10 acres were classified as timberland. The Northern Unit was the most urbanized and agriculturally oriented part of the State. The percent of the total area of land classified as timberland for the four units were Knobs, 41 percent; Upland Flats, 36 percent; Lower Wabash, 23 percent; and Northern, 9 percent.

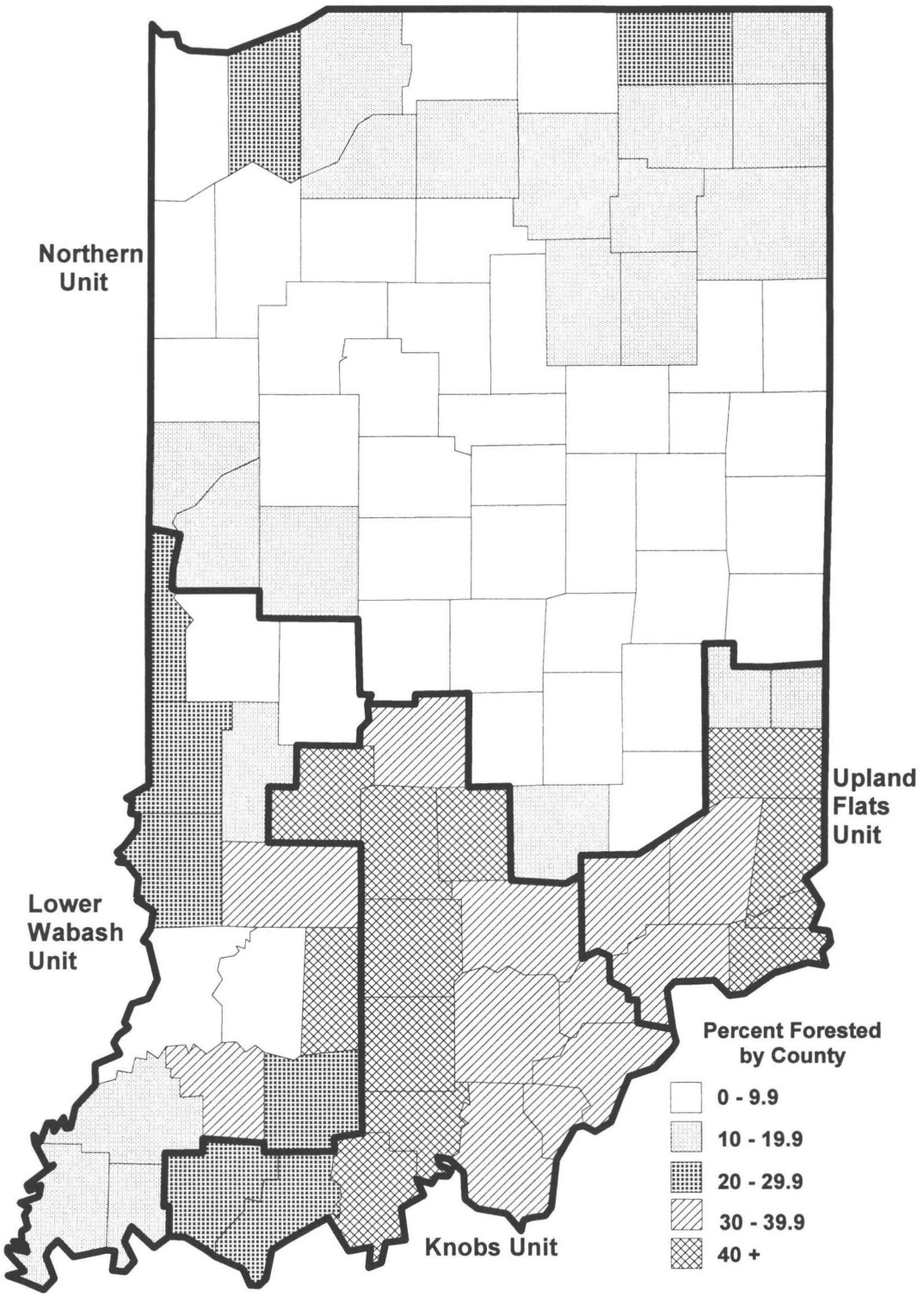

Figure 1.—*Forest land as a percent of land area by county, and Forest Survey Unit, Indiana, 1998.*

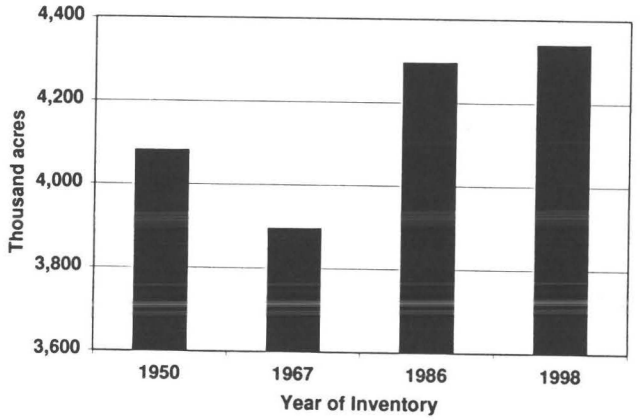

Figure 2.—*Area of timberland in Indiana by inventory time period.*

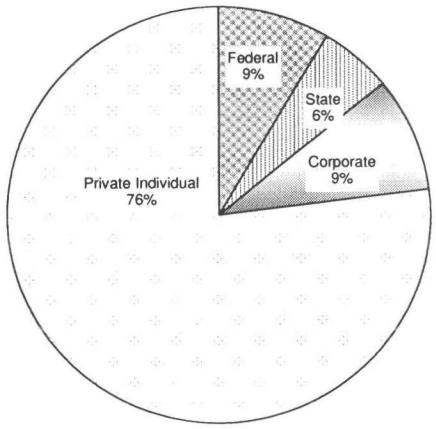

Figure 4.—*Area of timberland in Indiana by ownership, 1998.*

- Individual private landowners were the largest forest land ownership group in Indiana, owning 76 percent of all timberland in 1998. The Federal government was the largest public owner of timberland with 373 thousand acres, representing 9 percent of the total timberland area (fig. 4).

COMPOSITION OF INDIANA'S FORESTS

Area

- Indiana's forests were predominately hardwoods with 95 percent of the total area of timberland classified as hardwood forest types. The primary hardwood forest types in Indiana were oak-hickory with 1.6 million acres and maple-beech with 1.4 million acres (fig. 5).

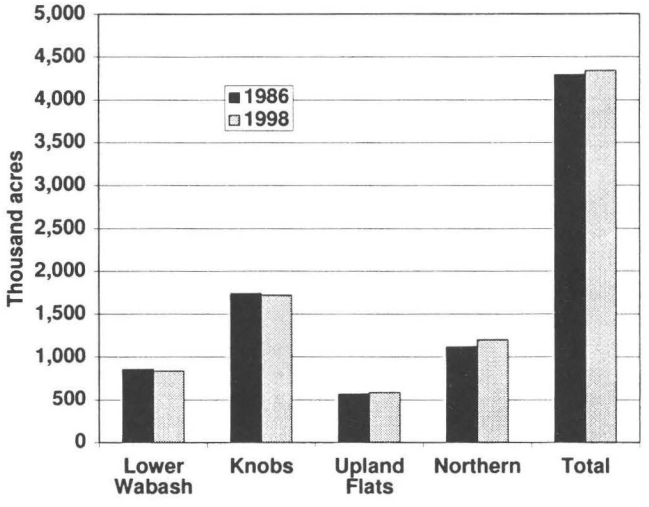

Figure 3.—*Area of timberland in Indiana by Unit, 1986 and 1998.*

- In 1998, conifer forest types represented 4 percent of the total area of timberland in Indiana. That year, there were 117 thousand acres dominated by eastern redcedar and 81 thousand acres dominated by pine.

- Between 1986 and 1998, the area of oak-pine, oak-gum-cypress, and maple-beech declined. The decline was primarily due to conversion of timberland to other land uses such as development.

- Increases in area of timberland between inventories occurred in the oak-hickory, elm-ash-cottonwood, and cherry-ash-yellow poplar forest types. Between inventories, increases in the oak-hickory forest type occurred as the stocking level of nonforest land with trees increased through increases in total number of trees and in the diameter of existing trees, which resulted in these stands being reclassified as timberland. In addition, selective harvesting and natural mortality caused the stands that had been classified as maple-beech to now be classified as oak-hickory. In previous inventories, elm-ash-cottonwood bottomland forests existed as narrow wooded strips but did not meet the minimum requirement for timberland (at least 120 feet in width). Over time, these narrow forests expanded in width to where, by 1998, they qualified as timberland, which contributed to the overall statewide increase in timberland.

- Between inventories, the area of sawtimber-size stands increased as Indiana's forests

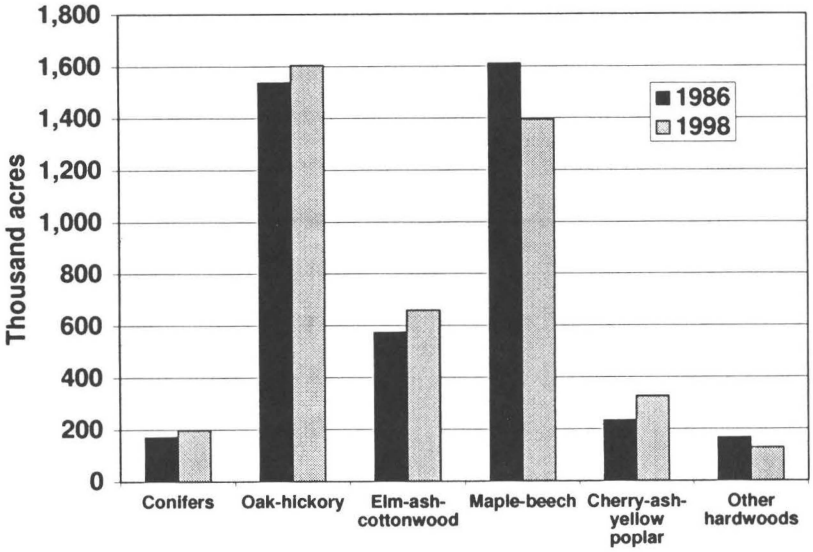

Figure 5.—*Area of timberland in Indiana by selected forest types, 1986 and 1998.*

continued to mature and increase their average diameters (fig. 6). Diameters are generally measured at 4.5 feet above ground and are referred to as diameter at breast height (d.b.h.). As the area in larger stands increased, the area in poletimber-size stands decreased. This change occurred as poletimber-size trees measured in 1986 increased their diameters to where, by 1998, they qualified as sawtimber-size trees. The area of timberland in sapling-seedling-size stands slightly declined between inventories. In 1986, sawtimber-size stands accounted for 64 percent of the total area of timberland. However, by 1998, sawtimber-size stands represented 70 percent of the total area of timberland.

- The increase in the average stand-size class in Indiana between inventories is an indication of a lack of significant disturbance through either natural occurrences or harvesting. Selective harvesting methods used in hardwood stands throughout the Central Hardwood Region do not cause the large-scale disturbances that are needed to reclassify the timberland as sapling-seedling-size stands. That the area in sapling-seedling-size stands remained static between inventories indicates that the new

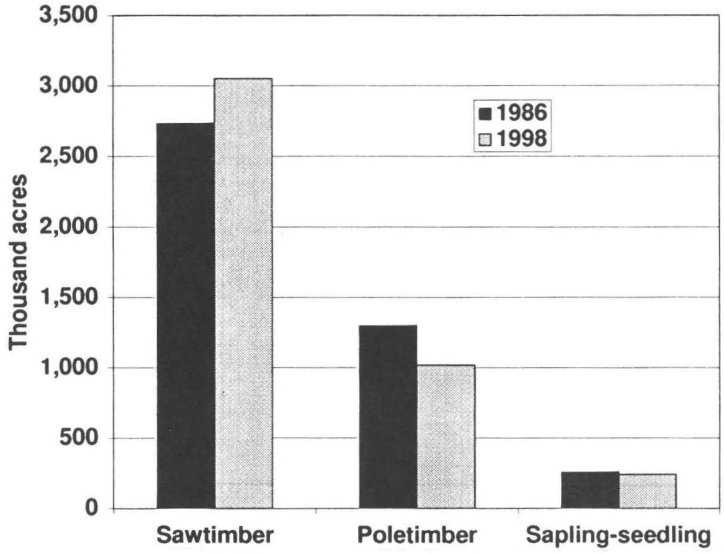

Figure 6.—*Area of timberland in Indiana by stand-size class, 1986 and 1998.*

area of timberland came from an expansion of the existing narrow strips of trees rather than from newly established timberlands.

- In 1998, 41 percent of the timberland in Indiana was considered fully stocked (fig. 7). Stocking is a measure of how well occupied the land is by trees. The goal of most forest managers is to maintain the forests in a fully stocked condition for optimum growth. There are many opportunities to improve the current growth rate and the overall health and vigor of Indiana's timberlands through increased management. Stocking rates could be increased on more than 50 percent of the timberland in Indiana.

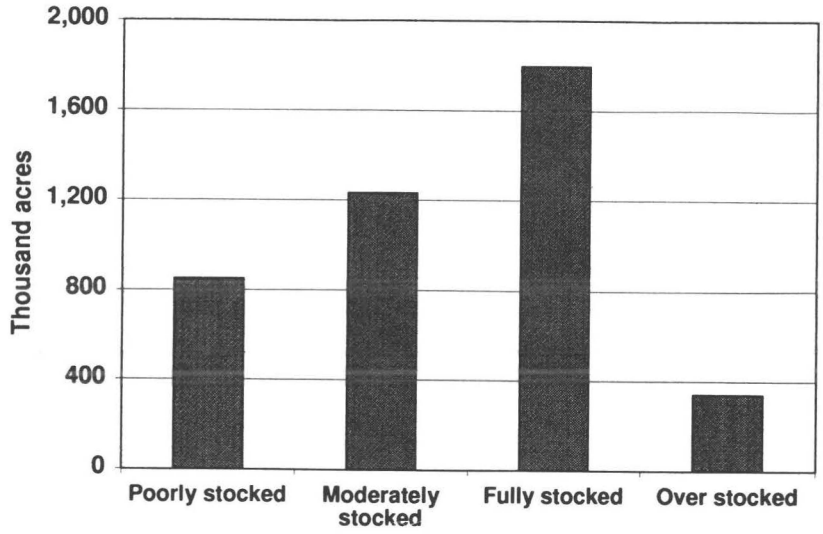

Figure 7.—*Area of timberland in Indiana by stocking class, 1998.*

- Indiana, well-known for its high quality soils, has some of the most productive timberlands in the United States. Potential productivity is an estimate of the volume growth per acre per year at culmination of mean annual increment of a fully stocked stand. Although this definition is intended for industrial wood production, it is a good measure of the potential for a forest to produce a wide array of products/benefits. In Indiana, 63 percent of the total area of timberland has the potential to produce more than 85 cubic feet of wood per acre per year (fig. 8). As a comparison, 29 percent of Michigan's timberlands have a potential productivity of more than 85 cubic feet per acre per year (Schmidt *et al.* 1997).

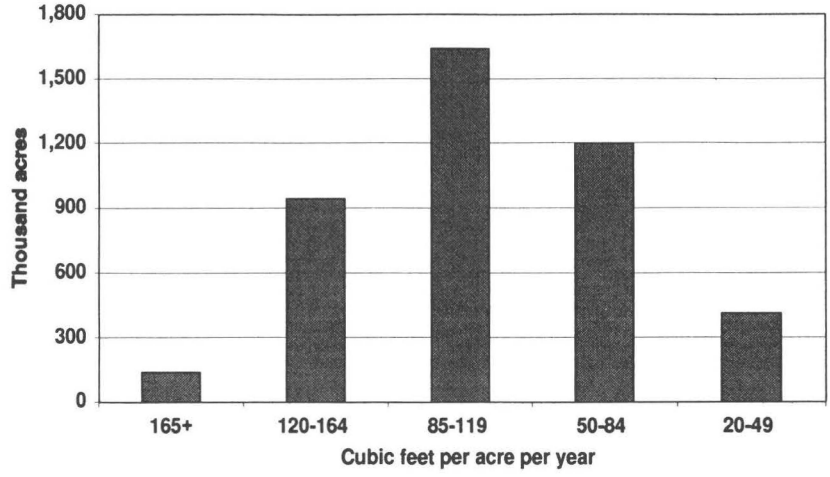

Figure 8.—*Area of timberland in Indiana by potential productivity class, 1998.*

- With Indiana's relatively high potential productivity, management to improve stocking becomes even more important. To optimize potential growth, timberlands should be fully stocked to produce a wide variety of forest-related products at an above average rate.

Number of Trees

- In terms of the total number of growing-stock trees, the hard maple group (sugar and black maple), with almost 300 million trees, was the most abundant species group. Eastern redcedar, with almost 76 million growing-stock trees in 1998, was the most abundant conifer.

- The number of growing-stock trees in Indiana increased from 1.78 billion in 1986 to almost 2.0 billion in 1998. With a 1998 statewide population of 5.9 million people, Indiana had 340 growing-stock trees for each citizen.

- Between 1986 and 1998, black cherry, tupelo, hackberry, and beech all increased in the total number of growing-stock trees by at least 40 percent.

- Oaks are of special concern in Indiana. Between 1986 and 1998, the total number of trees in the red oak species group increased by 9 percent and the total number of trees in the white oak species group increased by 7 percent.

Growing-Stock Volume

- Growing-stock volume increased from 5.2 billion cubic feet in 1986 to 6.9 billion cubic feet in 1998, reflecting the increase in both area and stocking during the 12 years between inventories. This increase continued the trend in Indiana of increasing growing-stock volume with each new inventory (fig. 9).

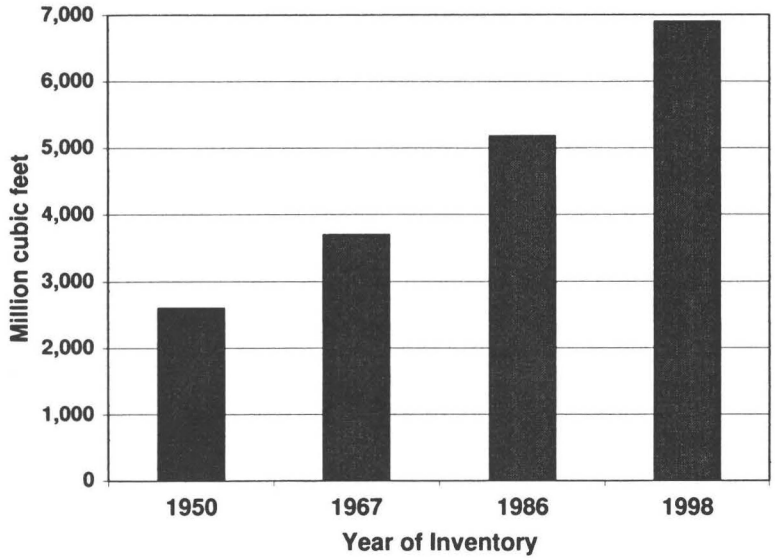

Figure 9.—*Total growing-stock volume in Indiana by inventory time period.*

- With the increase in total growing-stock volume, average timberland volume per acre also increased. Average volume per acre increased from about 680 ft^3 per acre in 1950 to 1,589 ft^3 per acre in 1998 (fig. 10). As a comparison, Michigan averaged 1,431 ft^3 per acre in 1993 (Schmidt *et al.* 1997). The relatively high level of growing-stock volume per acre in Indiana is a reflection of stocking rates and high growth-to-removals ratios. If stocking could be increased, average volumes would be expected to continue to rise, allowing for increased harvesting and other uses without threatening the resource.

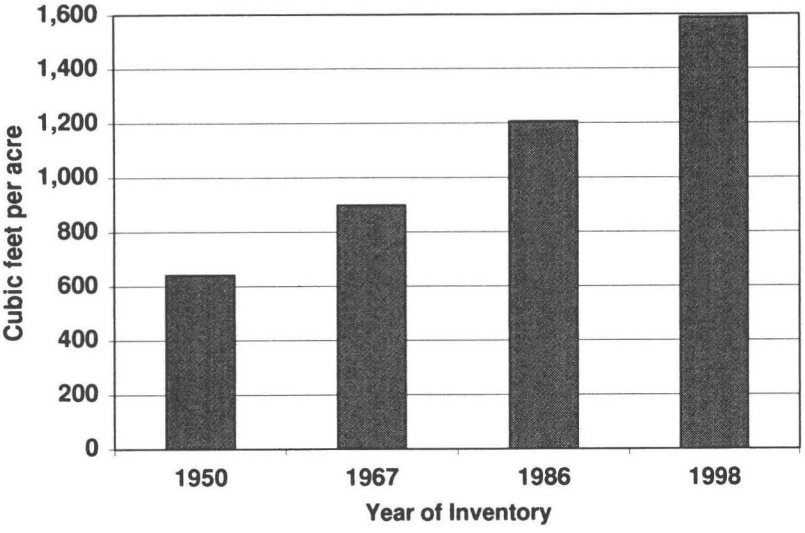

Figure 10.—*Average growing-stock volume per acre in Indiana by inventory time period.*

- Hardwood growing-stock volume increased between inventories in all four units. The Knobs and Northern Units had not only the most volume, but also the greatest total increases in volume (fig. 11). The Upland Flats Unit had the lowest total increase (210 million cubic feet) in growing-stock volume, but that volume still increased by 40 percent.

- The increase in growing-stock and sawtimber volume shows the dominance of Indiana's timberland by large stands and trees. As these forests mature, future regeneration might favor shade-tolerant species such as maples and beech. As a result, future regeneration of shade intolerant species might be expected to decline.

- In both 1986 and 1998, hardwoods accounted for 96 percent of all growing-stock volume. The species groups with the most growing-stock volume in 1998 were red oaks, white oaks, yellow-poplar, hickories, and hard maple (fig. 12).

- Growing-stock volumes for the red and white oak species groups increased between 1986 and 1998, except in the smaller diameter size classes (figs. 13 and 14).

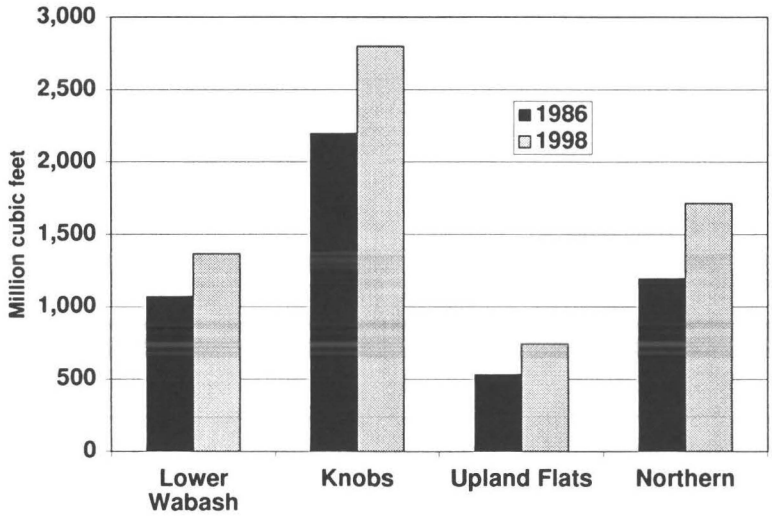

Figure 11.—*Hardwood growing-stock volume in Indiana by Unit, 1986 and 1998.*

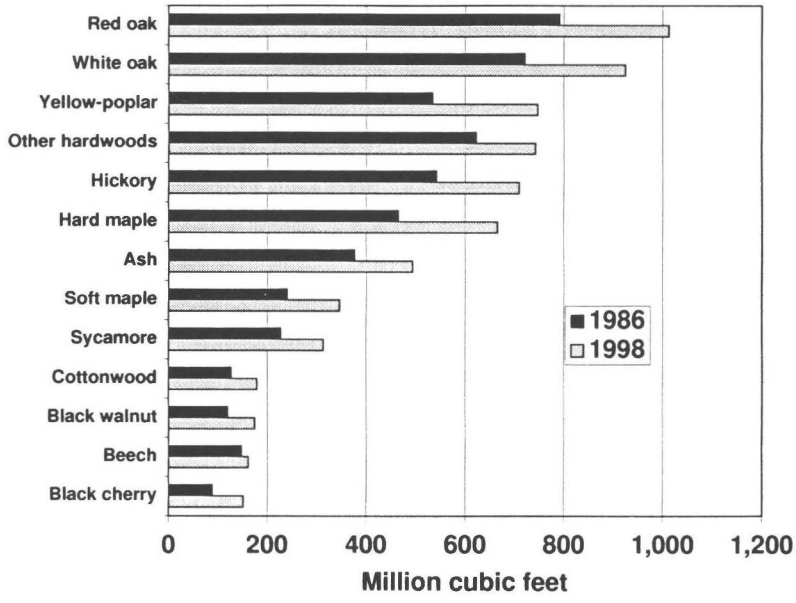

Figure 12.—*Hardwood growing-stock volume in Indiana by selected species groups, 1986 and 1998.*

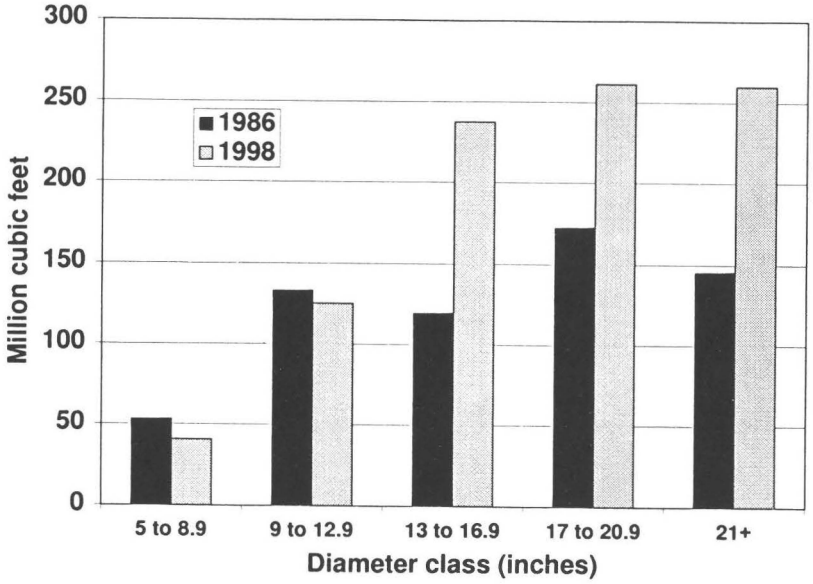

Figure 13.—*White oak growing-stock volume in Indiana by diameter class, 1986 and 1998.*

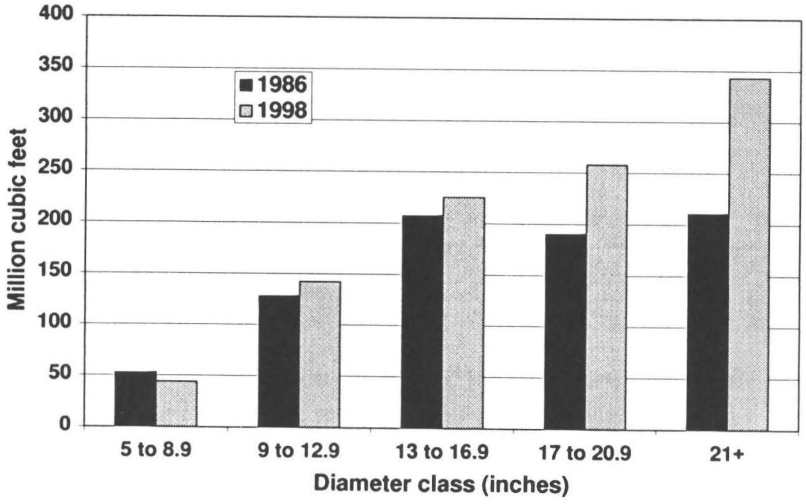

Figure 14.—*Red oak growing-stock volume in Indiana by diameter class, 1986 and 1998.*

- While the volume of red and white oak has been increasing, the percent of the State's total volume represented by oak has declined because of greater increases in volume by other species between inventories and the increase in area of the elm-ash-cottonwood forest type. In 1950, red oak represented more than 20 percent of Indiana's total growing-stock volume. However, in both 1986 and 1998, red oak represented only 15 percent of Indiana's total growing-stock volume. The situation was similar for white oak: increased total volumes but a decrease in relative statewide standing for growing-stock volume. This implies that while oaks continue to increase in volume, other species are beginning to dominate Indiana's timberlands.

- Black walnut and hard maple (sugar and black) both increased in growing-stock volumes between inventories (figs. 15 and 16). The majority of the volume increase occurred in the 13- to 21-inch diameter classes.

- In 1998, 88 percent of the total volume of timber in Indiana qualified as growing stock. In addition to growing-stock volume (6.9 billion cubic feet), Indiana had additional non-growing-stock volume in cull trees of 909 million cubic feet (short-log, rough, and

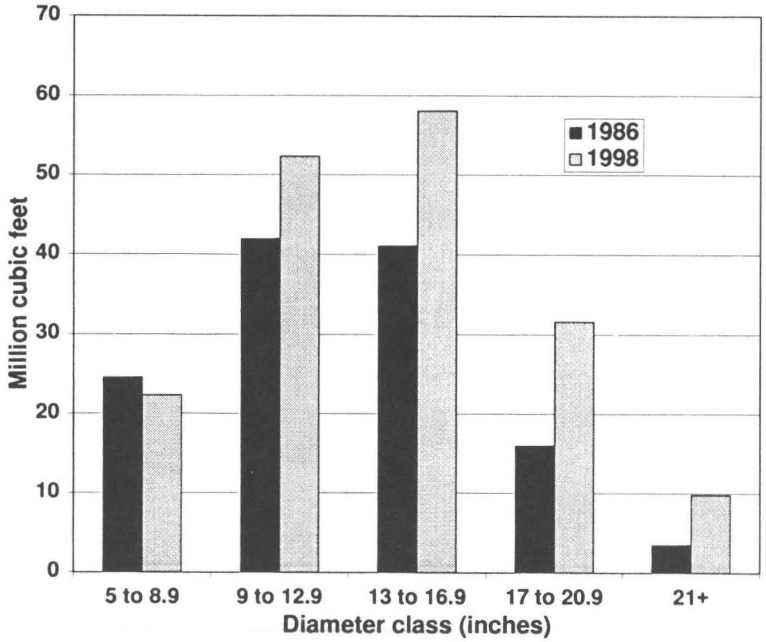

Figure 15.—*Black walnut growing-stock volume in Indiana by diameter class, 1986 and 1998.*

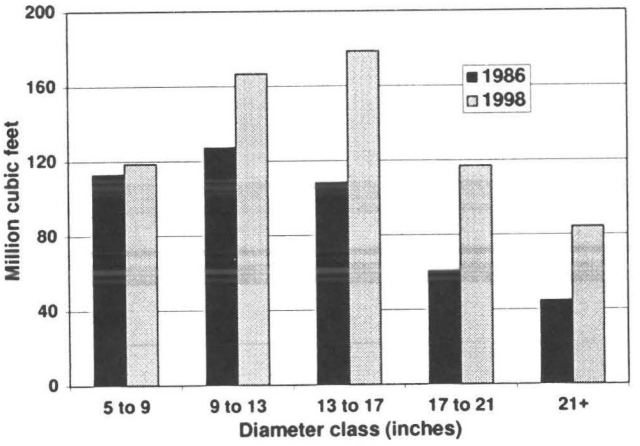

Figure 16.—*Hard maple (sugar and black maple) growing-stock volume in Indiana by diameter class, 1986 and 1998.*

rotten trees) and in salvable dead trees of 77 million cubic feet in 1998. In total, Indiana had 7.9 billion cubic feet of volume in 1998. While the vast majority of wood harvested in the State is from growing stock, these other sources of volume also contribute to the overall harvest and availability of wood fiber in Indiana.

Sawtimber Volume

- In 1998, sawtimber volume in Indiana totaled 26.2 billion board feet measured with the International 1/4-inch rule. Due to State and local interest, the following sawtimber volume discussions are presented using Doyle rule. To convert from Doyle rule to International 1/4-inch rule, please see the Appendix for conversion factors. Sawtimber volume is presented in both Doyle and International 1/4-inch rule in the tables in the Appendix.

- Overall, the sawtimber volume measured using Doyle is about 65 percent of the same sawtimber volume measured using the International 1/4-inch rule (fig. 17). The trends expressed for sawtimber volume using the Doyle rule hold true for the International 1/4-inch rule as well.

- In 1998, Indiana had more than 17.1 billion board feet (Doyle) of sawtimber volume. Of the total sawtimber volume, 35 percent was in trees with d.b.h. of more than 21 inches.

- The species groups with the most sawtimber volume include red and white oak, yellow-poplar, hickory, hard maple, and ash. All of these species groups had more than 1 billion board feet (Doyle) of sawtimber volume.

- Between 1986 and 1998, all hardwood species groups increased in sawtimber volume except for tupelo and butternut. The greatest percentage increase in sawtimber occurred in the black cherry, black walnut, cottonwood, hard maple, and hackberry species groups (fig. 18).

- The Knobs and Northern Units had the greatest increase in sawtimber volume between inventories. The Knobs Unit rose from 5.1 billion board feet to 7.4 billion board feet (Doyle), and the Northern Unit rose from 2.8 billion board feet to 4.4 billion board feet (Doyle).

- On an individual species basis, yellow-poplar (2.3 billion board feet Doyle), sugar maple (1.4 billion board feet Doyle), and white oak (1.8 billion board feet Doyle) had the most sawtimber volume.

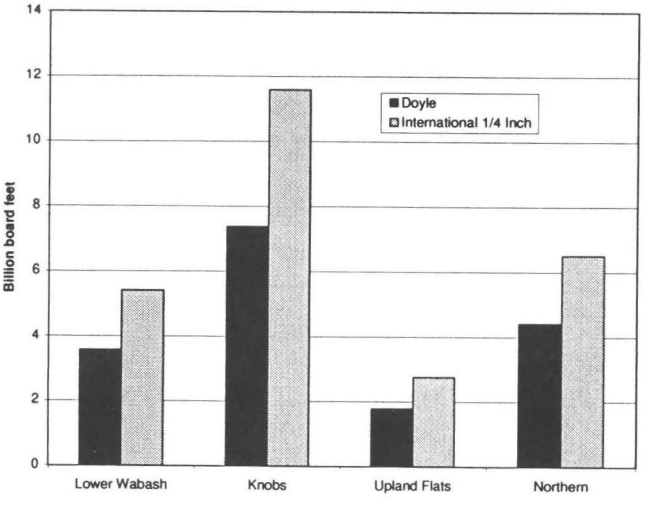

Figure 17.—*Comparison of total sawtimber volume in Indiana in 1998 between Doyle and International 1/4-inch rule.*

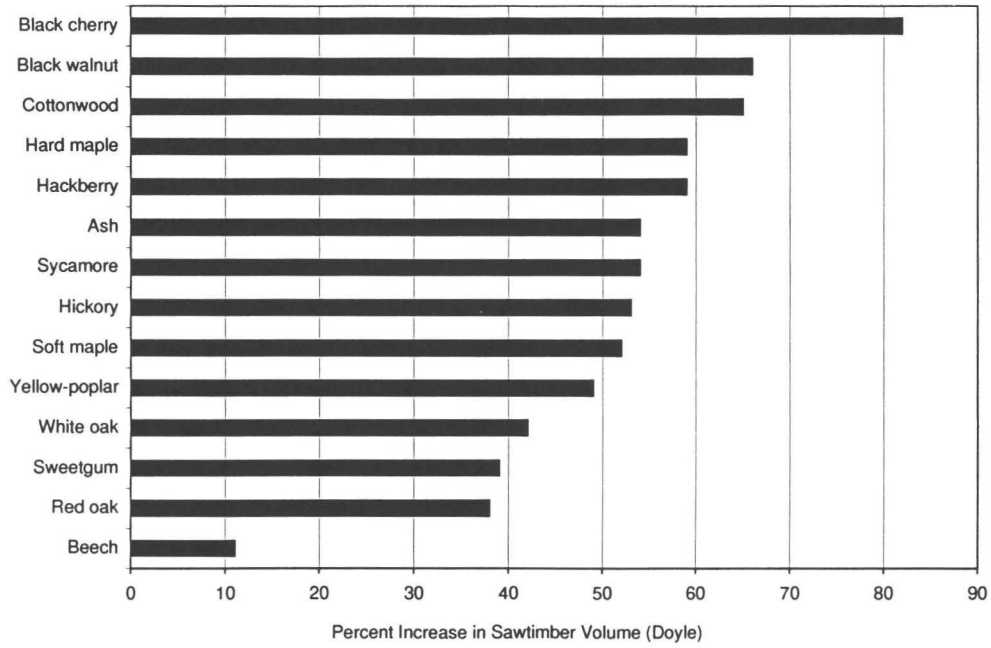

Figure 18.—*Percent increase in sawtimber volume in Indiana between 1986 and 1998 (Doyle).*

Quality of Sawtimber in Indiana

- The quality of Indiana's sawtimber has improved since 1986. As an example, the percentage of sawtimber in the highest quality classifications (grades 1 and 2) increased from 26 percent in 1986 to 49 percent in 1998 (fig. 19). The predominant reason for this improvement in quality was the increase in the overall size (diameters and lengths) of the sawtimber resource.

- The quality of white and red oak, black walnut, and ash improved between 1986 and 1998 (figs. 20, 21, 22, and 23). For these species, the quality increase was due primarily to increases in diameters and lengths of the trees' main bole.

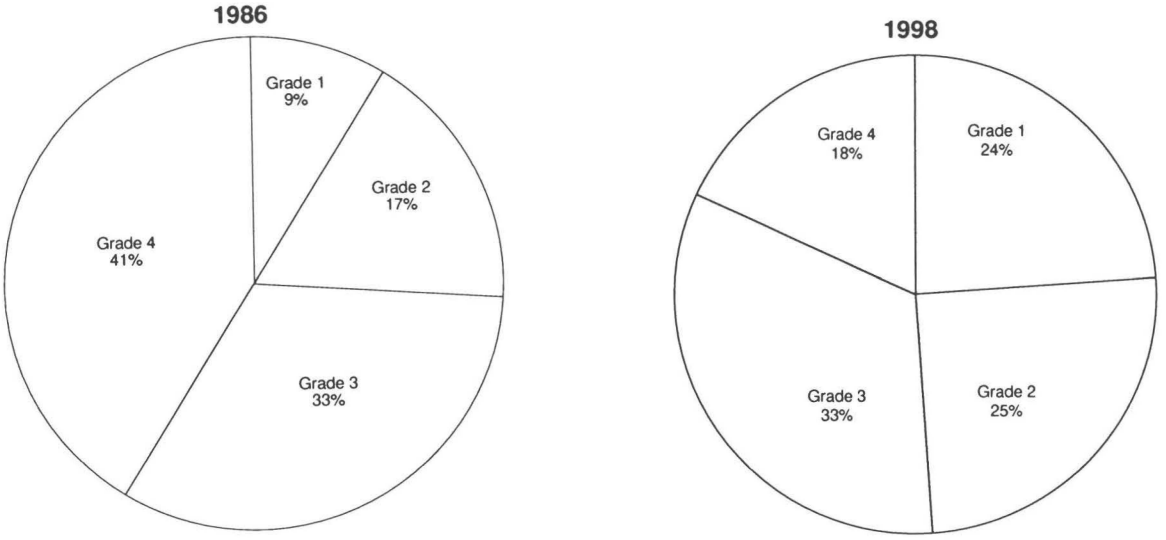

Figure 19.—*Percentage of sawtimber volume in Indiana by grade in 1986 and 1998.*

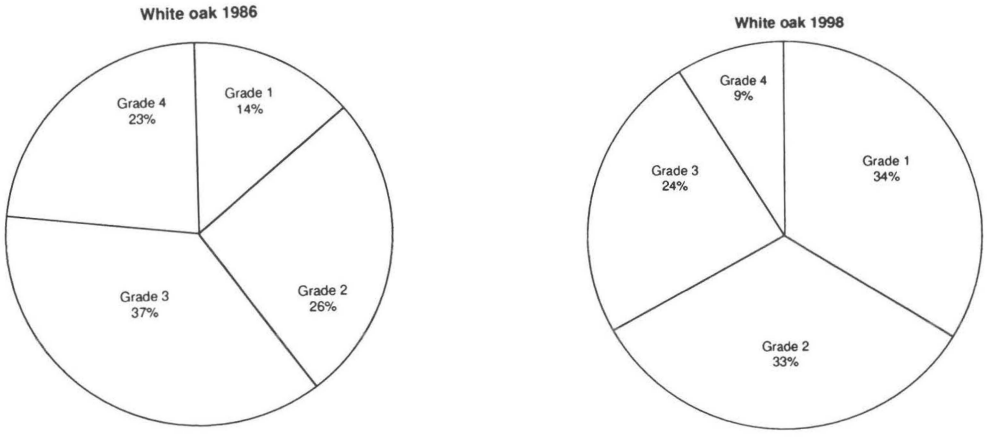

Figure 20.—*Quality of white oak sawtimber in Indiana by tree grade, 1986 and 1998.*

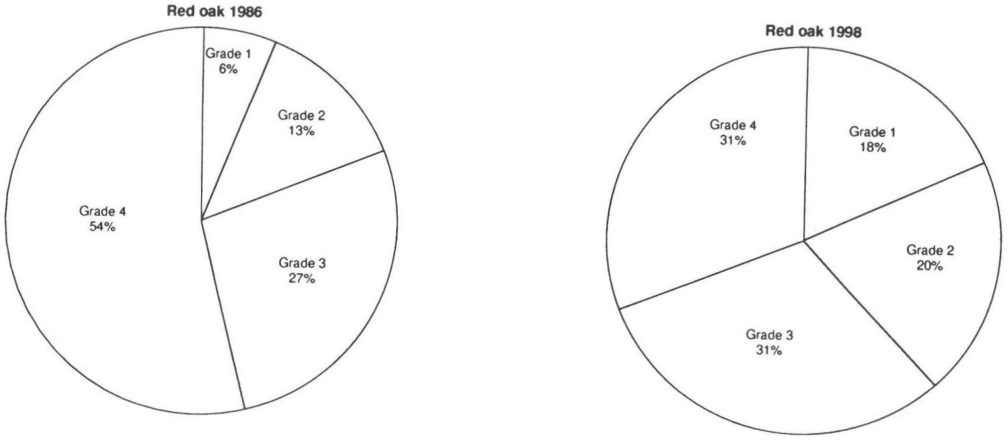

Figure 21.—*Quality of red oak sawtimber in Indiana by tree grade, 1986 and 1998.*

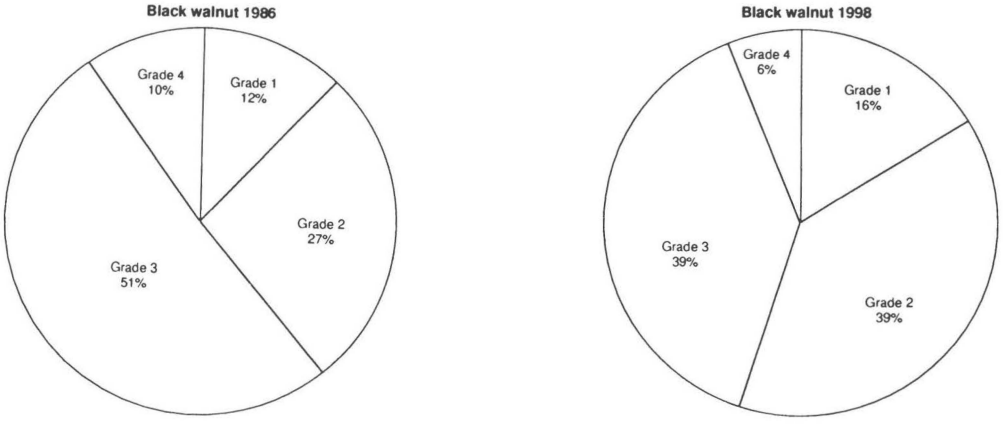

Figure 22.—*Quality of black walnut sawtimber in Indiana by tree grade, 1986 and 1998.*

Figure 23.—*Quality of white and green ash sawtimber in Indiana by tree grade, 1986 and 1998.*

CAUSES OF CHANGE IN INDIANA'S FORESTS

- The primary causes of change in Indiana's forests are natural successional processes, growth, mortality, and other natural disturbances; and human-induced changes such as harvesting and land-use change. These change factors often result in reclassifications from one forest type to another. For example, in 1998, our field crews re-visited some timberland sites that had been classified as oak-hickory forest type in 1986. They found that either succession had progressed to where the oak-hickory trees were replaced by more shade-tolerant hardwood species or harvesting had occurred which changed the species composition. If oak trees are harvested and if the advanced regeneration consists of shade-tolerant species such as maple and beech, the stand often converts to a different species composition and may be classified as a different forest type. For example, in 1986, there were 1,537.9 thousand acres classified as oak-hickory forest; in 1998, there were 1,603.8 thousand acres classified as oak-hickory forest. However, not all of the 1986 oak-hickory forests stayed as this same type during the 12 years between inventories. Of the oak-hickory acreage in 1986, 1,168.6 thousand acres stayed in the oak-hickory forest type, 170.8 thousand acres were reclassified as maple-beech, 33.8 thousand acres were reclassified as cherry-ash-yellow poplar, 69.8 thousand acres were reclassified as nonforest land without trees, and the other 94.9 thousand acres were reclassified into other forest types. Table A shows the FIA-determined changes in land-use classification between 1986 and 1998.

- Indiana's forest composition has shifted over time. Forest land reclassified into nonforest land represents a conversion of forest land into other land uses such as developed land (housing, road construction, and other human-induced land developments) and agriculture. In the 12 years between inventories, 381.9 thousand acres of timberland in Indiana were converted to nonforest land uses. During the same time period, 421 thousand acres of nonforest land converted to forest land.

- The new areas of timberland in Indiana came primarily from nonforest lands that were reclassified into elm-ash-cottonwood, maple-beech, oak-hickory, and cherry-ash-yellow poplar timberlands.

- Between 1986 and 1998, thousands of acres of timberland were reclassified into other forest types. These acres stayed as timberland but were reclassified because the species composition changed between inventories. Changes in species composition occur because of the maturation of the forest; natural disturbances such as wind storms and floods; and human activities such as harvesting, timber stand improvement (TSI), and tree planting.

Table A.-- Land-use classification changes in Indiana, 1986-1998

1986 Land classification Forest type/land use	1986 total area [2]	1998 Land classification [1]															
		Timberland - forest type												Reserved forest land	Nonforest with trees	Nonforest without trees	Water
		White pine	Shortleaf-Virginia pine	Eastern redcedar	Eastern redcedar-hardwoods	Oak-pine	Oak-hickory	Oak-gum-cypress	Elm-ash-cottonwood	Maple-beech	Cherry-ash-yellow poplar	Aspen-birch	Non-stocked				
	(Thousand acres)																
White pine	37.4	26.5	--	--	--	3.4	--	--	--	--	--	--	--	--	--	7.5	--
Shortleaf-Virginia pine	31.3	2.2	20.5	--	--	7.1	1.5	--	--	--	--	--	--	--	--	--	--
Eastern redcedar	17.5	--	--	8.3	3.2	3.0	--	--	--	--	--	--	--	--	--	3.0	--
Eastern redcedar-hardwood	85.3	--	--	10.0	45.9	3.0	11.0	--	--	--	--	--	--	--	--	15.4	--
Oak-pine	95.8	--	11.2	--	8.1	34.4	21.4	--	6.4	2.2	--	--	--	--	6.0	6.1	--
Oak-hickory	1,537.9	--	1.5	3.4	3.6	7.4	1,168.6	10.4	28.1	170.8	33.8	--	6.5	10.7	23.3	69.8	--
Oak-gum-cypress	67.8	--	--	--	3.4	--	12.9	22.0	12.2	9.2	--	--	--	--	6.6	1.5	--
Elm-ash-cottonwood	575.2	--	--	--	--	--	24.8	8.2	387.7	35.8	24.0	--	--	9.1	20.2	65.4	--
Maple-beech	1,611.1	--	--	3.0	12.3	12.4	260.4	--	109.7	977.8	91.2	1.8	11.4	--	48.5	82.6	--
Cherry-ash-yellow poplar	234.4	--	--	--	3.4	--	3.4	--	6.1	98.3	97.2	--	--	--	14.0	12.0	--
Aspen-birch	2.1	--	--	--	--	--	--	--	--	--	--	2.1	--	--	--	--	--
Nonstocked	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Reserved forest	139.0	--	4.5	--	--	--	--	--	5.4	3.3	--	--	7.2	93.2	7.0	18.4	--
Nonforest with trees	932.4	--	2.8	9.4	--	--	30.4	2.1	40.7	47.2	21.7	--	6.9	--	549.9	221.3	--
Nonforest without trees	17,634.9	1.2	10.5	3.3	--	6.4	69.4	--	63.8	49.3	59.5	3.3	--	46.1	256.9	17,051.2	14.0
Census water	419.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	80.7	338.3
Total	23,421.1	29.9	51.0	37.4	79.9	77.1	1,603.8	42.7	660.1	1,393.9	327.4	7.2	32.0	159.1	932.4	17,634.9	352.3

[1] Read across rows to determine dispersion of 1986 classes to 1998 classes. Read down columns to determine origin of 1998 classes.

[2] Total land area adjusted to conform to 1980 census figures.

To use Table A: for example, to find out what happened to the 1,538 thousand acres of oak-hickory in 1986 - simply read across the oak-hickory row and find that about 1,169 thousand acres stayed as oak-hickory, 171 thousand acres were reclassified as maple-beech, 23 thousand acres were reclassified as nonforest with trees, and so on.
To determine the source of the 1,604 thousand acres of oak-hickory in 1998, read down the oak-hickory column. Of these acres, 1,169 thousand acres were classified as oak-hickory in both inventories, 260 thousand acres were reclassified from maple-beech to oak-hickory, and so on.

- Timberlands undergo successional changes in species composition as natural regeneration replaces existing overstory trees. Overstory trees are lost through both natural mortality and harvesting. In Indiana, trees that replace the lost overstory arise primarily from natural regeneration. In addition, expansion of timberlands over time and increased stocking rates have occurred due to increased regeneration. Regeneration is generally considered to be in three classes of saplings/seedlings: seedlings less than 1 inch d.b.h., saplings from 1 to 2.9 inches d.b.h., and saplings from 3 to 4.9 inches d.b.h.

- Overall, Indiana's growing-stock regeneration, expressed in number of smaller trees, has consistently increased since a low in the 1960's (fig. 24).

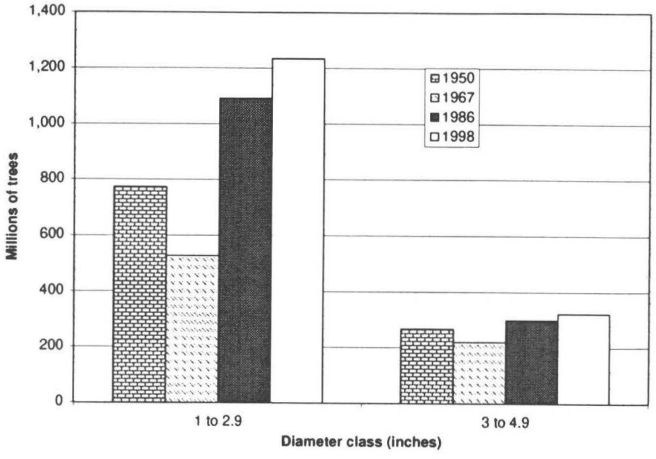

Figure 24.—*Total regeneration in Indiana by diameter class, by inventory period.*

- Because of the maturing of Indiana's forests, and the limited ability of white and red oak to regenerate under shade, the regeneration of these species is of concern. The total number of growing-stock white oak trees in the 3- to 4.9-inch d.b.h. class remained static between 1986 and 1998. Fortunately, the number of growing-stock white oaks in the 1- to 2.9-inch d.b.h. class rose from 19.9 million trees in 1986 to more than 23.6 million in 1998 (fig. 25). This represents an overall increase of 19 percent in the number of small white oak trees during the 12 years between inventories. This increase is partially a reflection of the attention paid to oak regeneration by professional land managers throughout Indiana.

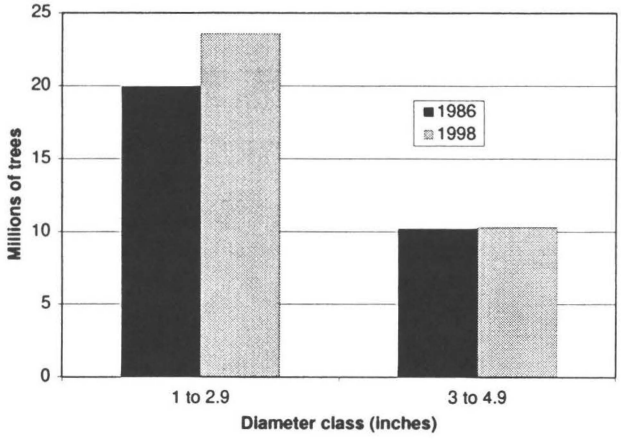

Figure 25.—*White oak regeneration in Indiana by diameter class, 1986 and 1998.*

- The total number of growing-stock red oak trees in the 1- to 2.9-inch d.b.h. class declined between inventories by 16 percent (fig. 26). This decline is of concern, but, the total number of growing-stock red oak trees in the 3- to 4.9-inch d.b.h. class increased by 90 percent between 1986 and 1998. In total, the number of small red oak trees increased by more than 4 million trees between 1986 and 1998. As with white oak, the increase in red oak saplings/seedlings reflects land managers' attention to oak regeneration.

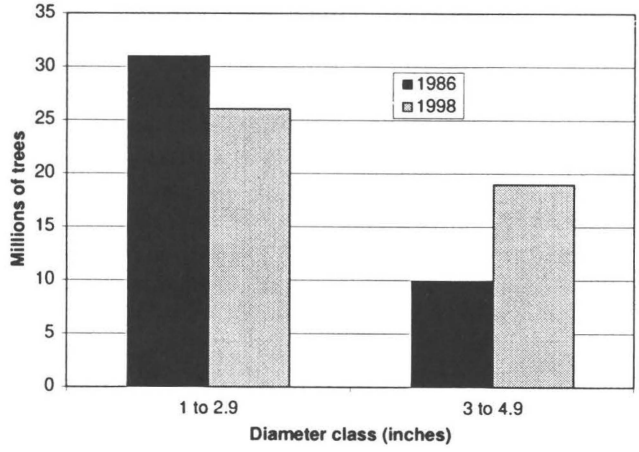

Figure 26.—*Red oak regeneration in Indiana by diameter class, 1986 and 1998.*

- For the near future, there should be sufficient oak regeneration to replace the existing older, mature oak when it dies or is harvested. Oak can be successfully regenerated, but following scientifically based management prescriptions is critical. Young oak seedlings can survive in shade for several years. However, seedlings must have adequate sunlight to successfully develop. The input of professional forest management using prescriptions for regeneration can be a major contribution to future oak success.

- Between 1986 and 1997, Indiana's average annual net growth of growing stock was 226 million cubic feet. This equates to an average annual net growth rate of 52 ft^3 of growing stock per acre for each of the 4.3 million acres of timberland in Indiana. Net growth rates are gross growth minus mortality.

- Pines accounted for 72 percent of the conifer average annual net growth for growing stock between 1986 and 1997, primarily in white, Virginia, and shortleaf pine.

- Eastern redcedar accounted for two-thirds of the total number of conifer trees but represented only 24 percent of the total conifer average annual net growth for growing stock. In Indiana, eastern redcedar has expanded in both area and number of trees (primarily smaller, newly established trees). Smaller trees generally have lower total growth rates due to their small diameters. One inch of diameter growth on a 3-inch tree (growing from 3 to 4 inches in d.b.h.) represents an increase in basal area from 7 to 13 square inches. However, 1 inch of diameter growth on a 10-inch tree (growing from 10 to 11 inches) represents an increase in basal area from 79 to 95 square inches. Thus, a large tree has a greater potential growth rate. As eastern redcedar in Indiana continues to become established and to grow in size and height, future average annual net growth rates should increase.

- Hardwoods accounted for 96 percent of Indiana's total average annual net growth. Hardwood species with the largest average annual net growth of growing stock were red oak, yellow-poplar, white oak, hard maple, ash, hickory, and soft maple. All of these species groups averaged at least 15 million cubic feet of growing-stock annual net growth between inventories.

- Indiana's average annual mortality of growing stock was 61 million cubic feet between 1986 and 1997. This equates to an average annual mortality rate of 14 ft^3 of growing stock per acre for each of the 4.3 million acres of timberland in Indiana. With an average annual mortality rate of 14 ft^3 per acre and a net growth rate of 52 ft^3 per acre, Indiana averaged a gross growth rate of 66 ft^3 per acre between inventories (gross growth equals net growth plus mortality). If mortality can be decreased through increased management, the additional growth could be available for harvest or other uses. However, mortality can also be positive because it provides coarse woody material for Indiana's riverine water systems and a variety of wildlife habitats.

- Between 1986 and 1997, the greatest total mortality occurred in red oak, elm, ash, white oak, and hickory. Elm mortality was primarily due to Dutch elm disease. Mortality on other species was due to a combination of old trees reaching the end of their life span, natural competition with other trees, flooding, and a variety of diseases and insects.

- Between 1986 and 1997, Indiana's average annual removals of growing stock were 88 million cubic feet. This equates to an average annual removal rate of 20 ft^3 of growing stock per acre for each of the 4.3 million acres of timberland in Indiana. This removal rate represents 1.3 percent of the total growing-stock volume in Indiana.

- The greatest hardwood removal rate occurred in the Lower Wabash Unit, where removals were 1.6 percent of the total growing-stock volume. The removal rates as a percent of total growing-stock volume for the other units were Knobs 1.3 percent, Upland Flats 1.3 percent, and Northern 1.0 percent. The lower than average use of wood fiber in Indiana's timberlands in the Northern Unit shows the potential for an industrial increase in this area. The limiting factors in the Northern Unit in timber utilization for wood fiber are the distances that harvested logs have to travel for processing, a different species composition, and small average tract

size when compared to the other units. Most of the wood fiber industry in Indiana is located in the southern portions of the State. As a result, only high quality trees in the northern part of the State warrant the additional travel costs associated with harvesting. There are opportunities to increase the number of portable sawmills because they can move to the trees rather than having the trees move to the processing facilities.

- The average annual removal rate for hardwood growing stock (87.7 million cubic feet) was 1.3 percent of the total hardwood growing-stock volume. Average annual removals of conifer growing stock were 505 thousand cubic feet, 0.2 percent of the total softwood growing-stock volume.

- Average annual net growth exceeded removals statewide and in all four units (fig. 27). All four units have an opportunity to increase their harvest rates without threatening long-term sustainability. In localized regions within the Lower Wabash and Upland Flats Units, removal rates are higher than the unit average and are closer to approximating growth rates. In these regions, removals for wood fiber industries might have to expand into broader drain areas, but wood fiber will be available based on the growth-to-removal ratios. Opportunities for expansion of wood fiber-based industries appear strongest in the Knobs and Northern Units based on average annual net growth rates compared to average annual removal rates.

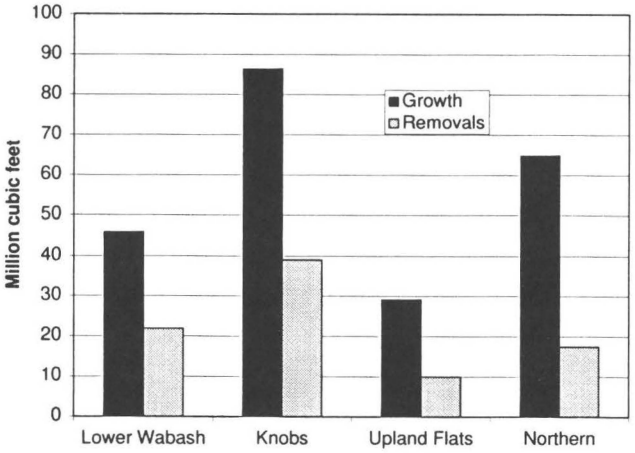

Figure 27.—*Average annual net growth and removals for hardwoods in Indiana by Unit between 1986 and 1998.*

- Between 1986 and 1997, the primary hardwood species groups harvested (growing-stock removals) in Indiana were yellow-poplar, red oak, white oak, hickory, ash, and sycamore.

- Projecting the current net growth rate for growing stock (~ 2 percent per year), and a 10-percent annual increase in removals shows that by 2008 Indiana will still have a positive growth-to-removals ratio (fig. 28). The 10-percent annual increase in removals is a significant increase because, after 10 years, it implies an overall increase in removals of 100 percent. In the Lower Wabash and Knobs Units, this potential increase could result in growth-to-removals ratios of about 1 to 1. However, due to the large volume of wood fiber that currently exists within these units, even this relatively large projected potential increase in harvesting does not threaten future sustainability. For the past 30+ years, all four units have been growing more wood fiber than what has been removed. Similar to putting money in the bank for future use, this "banked" wood fiber is available for future harvesting and will offset any short-term growth-to-removals ratios that approach 1 to 1.

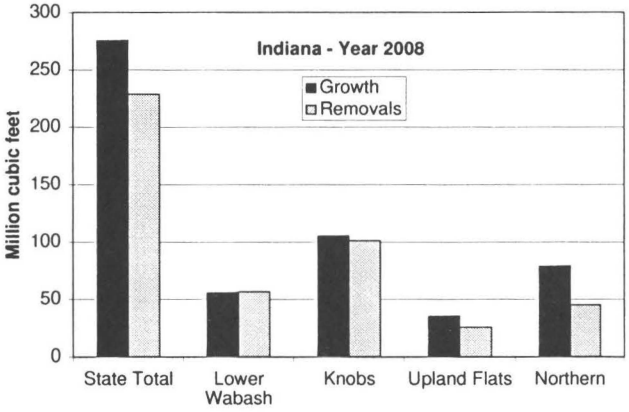

Figure 28.—*Projected average annual net growth and average annual removals by Unit, year 2008.*

APPENDIX

PUBLIC ACCESS TO FIA DATA

The data collected in both the 1986 and 1998 Indiana inventories used to compile the resource tables presented in this report can be easily accessed. Data can be obtained over the Internet by accessing the North Central Research Station website (http://www.ncfes.umn.edu/links.html) and clicking on the Databases and Analysis Tools button. Data from the inventories of every State in the Nation that were used to develop the 1997 Resources Planning Act (RPA) assessment can also be accessed at this site. Three independent databases are maintained at this site: the National FIA Database, the National Resources Planning Act (RPA) Inventory Database, and the National Timber Products Output (TPO) RPA Database.

The National FIA Database contains data from the previous (1986) and current (1998) ground plot-based inventories that were used to produce most of the estimates in this report. This includes all estimates of area; number of trees; volume; biomass; average annual net growth, mortality, and removals; and current net growth and mortality. The data are stored so that users can download portions of the database onto their own computers and produce their own estimates, or they can use an on-line table generation program to create user-specified tables similar to those presented in this report. This database is described in Hansen *et al.* (1992) and is documented on-line. Copies of the database and a table generation program are also available on a CD-ROM disc, which can be obtained by contacting the Program Manager, FIA, North Central Research Station, 1992 Folwell Avenue, St. Paul, MN 55108, (651) 649-5139.

The National RPA Inventory Database contains data from all States and represents a "point-in-time" inventory. Indiana inventory results contribute to this database. RPA inventories are conducted on a 10-year cycle with midcycle updates every 5 years. RPA inventories differ from FIA inventories in that historically FIA inventories have been periodic and based on the year of completion of field work for any individual State. Results are published as soon as possible after the field work results are compiled and analyzed. RPA inventories use the FIA inventory results and update them to a common year. The most recent RPA inventory represents the FIA inventories of all 50 States updated to the common year of 1997. Results are published on a regular cycle. This database is available on-line at (http://www.ncfes.umn.edu/links.html).

The National TPO RPA Database contains the data from a series of independent surveys of sawmills, pulp mills, fuelwood consumers, and other primary timber users summarized for 1996. Users of this database can access a table generation program and obtain estimates of the 1996 timber removals for Indiana and other States. May (1998) describes the NCFIA TPO Database that was used to provide North Central's input to the National TPO Database and the current annual removals estimates used in this report.

ACCURACY OF THE 1998 INDIANA SURVEY

FIA information is based on a sampling procedure designed to provide reliable statistics at the State and Survey Unit levels. Consequently, the reported figures are estimates only. A measure of reliability of these figures is given by sampling errors (table B). Sampling errors for area, volume, growth, and removals, for both growing stock and sawtimber, in Indiana are shown in table 56. Sampling error means that the chances are two out of three that if a 100-percent inventory had been made, using the same methods, the results would have been within the limits indicated.

For example, the estimated growing-stock volume in the State in 1998, 6,900.3 million cubic feet, has a sampling error of ± 2.18 percent (± 150.4 million cubic feet). The growing-stock volume from a 100-percent inventory would be expected to fall between 6,749.9 million cubic feet and 7,050.7 million cubic feet (6,900.3 ± 150.4), there being a one in three chance that this is not the case.

Table B.—*Sampling error for the 1998 inventory of Indiana's forests*

Item	State totals	Sampling error
Forest land	***Thousand acres***	***Percent***
Forest land area (1998)	4,501.3	1.52
Timberland area (1998)	4,342.3	1.59
All live	***Million cubic feet***	
Volume (1998)	7,809.2	2.09
Current net growth (1998)	251.0	1.95
Current mortality (1998)	117.8	2.98
Average annual net growth (1986-1997)	254.8	2.06
Average annual mortality (1986-1997)	98.5	3.41
Average annual removals (1986-1997)	107.8	7.95
Growing stock	***Million cubic feet***	
Volume (1998)	6,900.3	2.18
Current net growth (1998)	211.8	2.04
Current mortality (1998)	94.0	3.06
Average annual net growth (1986-1997)	226.3	2.36
Average annual mortality (1986-1997)	61.4	3.89
Average annual removals (1986-1997)	88.2	8.27
Sawtimber	***Million board feet***	
Volume (1998)	26,247.3	2.47
Current net growth (1998)	641.4	2.39
Current mortality (1998)	321.1	3.58
Average annual net growth (1986-1997)	942.9	2.53
Average annual mortality (1986-1997)	156.5	5.36
Average annual removals (1986-1997)	375.6	8.73

As survey data are broken down into sections smaller than State totals, the sampling error increases. For example, the sampling error for timberland area in a particular county is higher than that for total timberland area in the State. The sampling error for estimated area of forest and timberland, volume, average annual net growth, and average annual removals of growing stock and sawtimber at the county and Unit levels are presented in table 56. To estimate sampling error for other estimates smaller than State totals, use the following formula:

$$E = \frac{(SE)\sqrt{(\text{State total volume or area})}}{\sqrt{(\text{Volume or area smaller than State total})}}$$

Where:

E = Sampling error in percent.

SE = State total sampling error for volume or area.

For example, to compute the sampling error on the area of timberland in the maple-beech type for the State, proceed as follows:

1) Total statewide area of maple-beech type = 1,603.8 thousand acres.
2) Total statewide area of all timberland = 4,342.3 thousand acres.
3) The State total sampling error for timberland area = 1.59 percent.
4) Using the above formula:

$$E = \frac{0.0159\sqrt{4,342.3}}{\sqrt{1,603.8}}$$

E = 0.026 or 2.6 percent sampling error for the maple-beech forest type.

The sampling error within a county depends primarily on the county size and the variability of the resource within the county. The more heavily forested counties in the State had sampling errors of between 5 and 15 percent

for estimates of timberland area and between 5 and 20 percent for estimates of growing-stock volume. In counties where timberland area was less than 30,000 acres, the sampling errors for timberland area generally exceeded 20 percent and for growing-stock volume they might have exceeded 30 percent. Because of the relatively high sampling error, counties with less than 30,000 acres of timberland were combined into county groups.

COMPARING THE FOURTH INVENTORY OF INDIANA WITH THE THIRD INVENTORY

A new volume estimation procedure was used to compute the 1998 volumes and also to recompute the 1986 volume. Although the adjustment will differ by Survey Unit and species, the recomputed 1986 growing-stock and sawtimber volumes will generally be somewhat less than those shown in the 1986 report. The recomputed 1986 sawtimber volume is 5 percent less than what was reported in the 1986 report and for growing-stock volume the decrease is less than 1 percent.

A new algorithm was used in 1998 to assign forest type and stand-size class to each condition observed on a plot. This new algorithm is being used nationwide by all FIA units to provide consistency from State to State. This new algorithm was also used to reassign the forest type and stand-size class of every plot measured in the 1986 inventory. This was done so that changes in forest type and stand-size class would reflect actual changes in the forest and not changes due to a change in algorithms. The list of recognized forest types, grouping of these forest types for reporting purposes, equations used to assign stocking values to individual trees, definition of nonstocked, and names given to the forest types changed with the new algorithms. Previously, stands were classified nonstocked if they had less than 16.7 percent stocking in growing-stock trees. The current definition of nonstocked is stands with less than 10 percent stocking in all live trees. Under this new definition of nonstocked, all plots classified as nonstocked in 1986 were reclassified as being stocked in 1986.

The basic building block for estimating forest area and timber volume has been changed from the Survey Unit to the county or county group. In the past, the statistics were developed at the Unit level and prorated back to the county on the basis of photo-interpretation points. Direct development of county-level data helps users interested in more precise local data, but can make data comparisons with past estimates misleading. For example, the 1986 inventory publications showed 9,900 acres of white pine timberland in the Lower Wabash Unit. The 9,900 acres were shown to occur in every county (table 14, Spencer *et al.* 1990) because area of timberland for each forest type was prorated back to each county. In this publication, we estimate that the total area of white pine timberland in the Lower Wabash Unit is 10,600 acres. Table 3 in this report shows that these acres occur in three counties (Clay, Green, and Pike). Survey Unit level comparisons of change between inventories are valid: the 700-acre increase in white pine timberland between 1986 and 1998 in the Lower Wabash Unit is a valid estimate of the change that occurred across the entire Unit. However, it is not valid to estimate change at the county level: a statement, such as white pine timberland doubled in 3 counties and disappeared for the other 11 counties, would not be valid because of the way the 1986 estimates were prorated to the county level.

SURVEY PROCEDURES

The 1998 Indiana survey used a two-phase sample for stratification that remeasured the inventory plots from the 1986 inventory and used a growth model in the estimation of both current conditions and change over time. Two-phase sampling, also called double sampling, consists of a phase 1 sample used to estimate area by strata and a phase 2 sample to estimate the average value of parameters of interest within these strata. The estimated population total is the sum across all strata of the estimated strata area times the estimated mean.

The 1986 Indiana inventory was intensified to provide lower sampling errors and to improve county-level estimates. Funding for the intensification of the 1986 inventory was provided by the Indiana Department of Natural Resources—Division of Forestry. The 1998 inventory was not intensified, thus the 1998 inventory represents a less intense sample and is based on the measurement of fewer ground plots than the 1986 inventory. In the 1998

inventory, only a 50-percent systematic sample of the 1986 ground plots was used due to the lower sampling intensity. New plots were established only to replace 1986 plots that could not be remeasured. These new plots were established as near as possible to the original plot. The growth model used in the Indiana survey design was the Central States Stand and Tree Evaluation and Modeling System (STEMS) (Miner *et al.* 1988). Because of the remeasurement nature of the 1998 inventory, procedures for both the 1986 and 1998 inventories are discussed.

Phase 1 Stratification

1986 Photo Plot Sampling of Aerial Photographs

In the 1986 inventory, the aerial photographs were assembled into township mosaics, and a systematic grid of 121 one-acre photo plots (each plot representing approximately 190.4 acres) was overlaid on each township mosaic. Each of these photo plots was examined by aerial photo interpretation specialists and classified stereoscopically based on land use, forest type, and stand-size density. A total of 126,629 photo plots formed the basis for the 1986 stratification. From these photo plots, a systematic sample of 11,440 plots were selected as ground plots and further examined by survey crews to verify the classification and to take further measurements. Of the ground plots, 2,140 plots were on forest land. These 1986 ground plots formed the basis for the remeasured ground plots in the 1998 inventory.

1998 Computer-assisted Classification of Satellite Images

Between inventories, FIA changed its phase 1 methods. Current inventories are based on a computer-assisted classification of LandSat Thematic Mapper satellite imagery. Image classification was conducted by Indiana State University as part of the Gap Analysis Program (GAP). The purpose of GAP (a nationwide multi-agency cooperative program) is to provide broad geographic information on the status of ordinary species and their habitats. FIA used the GAP classifications to form two initial strata, forest and nonforest strata (table C). Pixels that were within 60 m (2 pixel width) of a forest/nonforest edge formed two additional strata—forest/nonforest and nonforest/forest. Forest pixels within 2 pixels of a nonforest pixel (in any direction) were classified forest/nonforest, and nonforest pixels within 2 pixels of a forest pixel were classified nonforest/forest. An overlay of all National Forest land ownership was used to identify all lands owned by the Hoosier National Forest. The National Forest lands were treated as a single strata. Stratification and estimation was conducted at the county or county group level. In a few counties, the forest and forest/nonforest strata were combined because there were fewer than five ground plots in one of these strata. Final estimation of area by strata was based on these five strata—National Forest, forest, forest/nonforest, nonforest/forest, and nonforest (table C).

Table C.—*Satellite image pixel classification, 1998 Indiana inventory*

Estimation strata	Total pixels
National Forest	845,763
Forest	10,729,164
Forest/nonforest	12,623,507
Nonforest/forest	15,558,475
Nonforest	64,301,056
All classes	104,057,965

In the 1986 inventory, the stratification was completed by interpretation of the photo plots. The move to GAP satellite imagery changed FIA's Phase 1 sample from being based on one photo plot every 190.4 acres to a sample based on a classified pixel every 0.22 acres. The increased intensity of the Phase 1 sample greatly improved estimates of the area within each stratum, particularly at the county level. Thus, the stratification used in the 1998 inventory was based on 104 million pixels rather than the classification of 126,629 photo plots. Also, because classification was conducted using a computer-assisted algorithm across the entire State, biases in the photo plot sampling method that resulted from differences in photo quality, age of photography, and experience of the photo interpreter were eliminated, and classification was consistent across the entire State.

Phase 2 Ground Plot Measurements

1986 Plot Design

In 1986, plots classified as timberland, wooded pasture, or windbreak (at least 120 feet wide)

were measured. Each ground plot consisted of a cluster of 10 subplots covering approximately 1 acre. At each subplot, trees 5.0 inches or more in d.b.h. were sampled on a 37.5 Basal Area Factor (BAF) variable-radius plot, and trees less than 5.0 inches d.b.h. were sampled on a 1/300-acre fixed-radius plot. The arrangement of the 10 subplots within the plot was adjusted if they were located in a land use that was different from subplot 1. Under the estimation procedures used in this inventory, the entire plot measurement represented a single land classification. Thus, if a subplot was located outside of the land classification for the plot, it was rotated into the land classification. For example, if subplots 1 through 9 were located in a forest land classification and subplot 10 fell in a pasture, subplot 10 was rotated back into the forest land classification. These plots were established, monumented, and measured as part of the 1986 field inventory. Timberland, wooded pasture, and windbreak plots were monumented using metal stakes and permanent paint marks on trees to facilitate the remeasurement of the plot. Plots on other land uses were monumented with a pinprick on the aerial photograph.

1998 Plot Design

In 1998 phase 2, a set of ground plot locations from the 1986 inventory were transferred to the most recent aerial photographs available and overlaid onto the classified satellite imagery. Those 1986 ground plots that definitely were not forest land were given a nonforest ground land-use classification and were not sent to the field for measurement unless the plot had been a forest plot in the 1986 inventory, or it was so close to a forest edge that part of the plot could possibly fall in a forest area. If any portion of the plot included forest land (including reserved forest land, unproductive forest land, and timberland), wooded pasture, or windbreaks (at least 120 feet wide), it was either remeasured or modeled. New plots were only established if the original plot could not be relocated, in which case a new plot was established in what was considered the original plot location. Measuring ground plots on all forest lands represented a major change between the 1986 and 1998 inventories. In 1986, plots on reserved and unproductive forest land were not measured.

All ground plots were classified as "undisturbed" or "disturbed" by comparing the 1986 and 1998 aerial photography of the plot location. Disturbance here refers to a major change in forest vegetation caused by factors such as harvesting, land-use change, or a major mortality event. All disturbed plots and a one-third sample of the undisturbed plots were remeasured to obtain estimates of current condition and changes since the last inventory. In the remeasurement of the 1986 ground plots, only subplots 1 through 5 were measured. On these five subplots, all trees measured on these plots in 1986 were remeasured or otherwise accounted for, and all new trees that should be tallied using the 1986 plot design were identified and measured. These measurements formed the basis for change estimates between the two inventories such as average annual net growth, mortality, and removals.

Two-thirds of the ground plots that were timberland at the time of the 1986 inventory and determined to be undisturbed until this inventory were projected to the current time using STEMS. This procedure gave projected estimates of current volume and growth for these undisturbed plots. The comparison of the projected 1986 ground plots (two-thirds of the total sample) and observed values on the remeasured 1986 ground plots (one-third of the total sample) of the undisturbed forest plots provided local calibration data. The calibration data were used to adjust the projected values of the undisturbed plots that were not remeasured. The adjustment procedure is a modified version of the method described by Smith (1986).

The undisturbed timberland plots that were not remeasured played a crucial role in the survey design. These plots were determined to be undisturbed and had conditions that could be simulated by STEMS. The STEMS growth model was used to "grow" the old plot and tree data to produce an estimate of current data. Thus, these plots were treated as ground plots in the estimation of forest area, number of trees, volume, net growth, and mortality even though they were not revisited. The plot record for each modeled plot was sent to the field for verification of current ownership information.

All old plots classified as disturbed were sent to the field for remeasurement to assess and verify changes since the last inventory. Disturbance refers to any change on a plot that

can be detected on the aerial photographs and that the STEMS growth processor cannot predict, such as catastrophic mortality, cutting, regenerating stands, and land-use change.

In the 1998 inventory, the new plot design used was based on the Forest Health Monitoring Program (FHM) plot design. The new 1998 design was overlaid over the 1986 design so that estimates of change could be based on the old plot design and estimates of current conditions could be based on the new plot design.

The overall plot layout for the new design consisted of four subplots spaced 120 feet apart in a triangular arrangement (fig. 29). The center of the new plot was located at the same point as the center of the 1986 plot. All trees less than 5 inches d.b.h. were measured on a 6.8-foot-radius (1/300th acre) circular micro-plot located at the center of each of the four subplots. Trees with diameters 5 inches and larger were measured on a 24-foot-radius (1/24th acre) circular plot. Each subplot was mapped for forest condition. Subplots were not rotated even if they fell into another condition. Factors that would determine a change in condition from subplot one were changes in forest type, stand-size class, land-use, ownership, and density. Each condition that occurred anywhere on one of the subplots was identified, described, and mapped if the condition in total met or exceeded 1 acre in size (the 1-acre minimum size for a condition to be identified could include land off-plot). Each condition was assigned a condition number, and condition information was recorded.

Another change in plot measurements that came with the 1998 inventory was the determination of the exact plot location of every ground plot in the inventory. For plots that were visited in the field, this was done using a Global Positioning System (GPS) device at plot center. For the nonforest and undisturbed forest plots that were not visited, plot location was determined by transferring the old plot location from the aerial photography to an unclassified, geo-corrected LandSat TM image. Both procedures provided an accurate location that was used to link the ground plots to the classified GAP data used for stratification.

Estimation

The following sections briefly describe the estimation procedures used to produce the resource tables presented in this and other FIA reports as well as the estimates produced by the table generation programs that are available on CD-ROM or over the Internet. The estimation procedures for computing statistics from this sampling design are somewhat complicated by the fact that not all parameters of interest are observed on every plot. For estimation purposes, the inventory is considered as three different samples, one that uses only the plots that were actually remeasured, one that uses the remeasured and updated plots, and one that uses all plots (remeasured, updated, and new plots). Table D summarizes the distribution of all ground plots for the new inventory design by type of plot.

All estimates from this inventory are based on double sampling for stratification. Cochran (1977) provides a good general presentation of double sampling for stratification, and Loetsch and Haller (1964) provide a more detailed presentation in a forest inventory context. Scott and Bechtold (1995) describe details of the estimation arising from changes in the plot design related to observing more than one condition on a plot.

From subplot center	120' to subplot center	Azimuth
1	2	0°
1	3	120°
1	4	240°

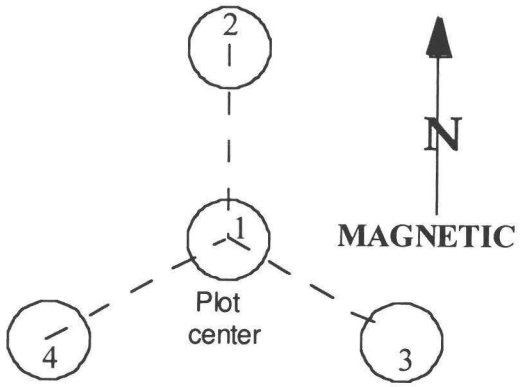

Figure 29.—*Standard plot layout for 1998 Indiana inventory.*

Table D.—*Distribution of ground plots for the 1998 inventory of Indiana's forest resources*

Ground land-use class	Old plots remeasured	Old plots updated	New plots	Total plots
Timberland	908	385	16	1,309
Reserved forest land	16	4	36	56
Nonforest with trees	203	59	13	275
Nonforest without trees	2,062	2,573	12	4,647
Census water	16	22	1	39
Total	3,205	3,043	78	6,326

Current (1998) Area

In double sampling for estimation, each phase 2 sample (ground plot) in a stratum is assigned an area equal to the total estimated area in that stratum divided by the number of phase 2 samples (ground plots) in the stratum. This assigned area is referred to as the expansion factor for the plot and represents the individual plot's contribution to the estimation of current total area. A typical plot in the 1998 inventory has an expansion factor of about 3,650 acres. This amount will vary from plot to plot because of the random variability in the sampling process.

The 1998 plot design was used to estimate all 1998 area estimates such as those presented in tables 1-9, 31, and 32. When a ground plot was observed to be entirely within a single condition, the plot's contribution towards the estimated total area of that condition was the plot's total expansion factor. When a plot straddled more than one condition, the expansion factor was allocated to the various conditions in direct proportion to the proportion of the plot that condition occupied. For example, a plot with an expansion factor of 3,600 acres that was observed to be 50 percent in oak-hickory timberland, 30 percent in maple-beech timberland and 20 percent in nonforest land would contribute 1,800 acres to the total estimated area of oak-hickory timberland, 1,080 acres to the total estimated area of maple-beech timberland, and 720 acres to the total estimate of nonforest land. The estimates of current area were based on all ground plots (remeasured, projected, and new) and the four strata defined by the 1998 GAP classification.

The average expansion factor for a plot of 3,650 acres can be used to estimate approximately how many plots contribute to a particular area estimate. This is useful to users concerned with the significance of an estimate. For example, table 3 reports there are 29,900 acres of timberland in the white pine type statewide. Using the 3,650 acres per plot as an average expansion factor, we estimate that about eight plots would be observed to be white pine timberland. In actuality, white pine timberland was observed on 13 plots. Of these 13 ground plots, 5 were entirely in the white pine type and the other 8 were partially in the white pine type. These eight plots ranged from having 3 percent of the plot in white pine to 53 percent of the plot in white pine.

Area Change (1986-1998)

Area change estimates such as those presented in table A were based only on remeasured and projected plots and use the four strata defined by the 1998 GAP classification. New plots were not included in the sample because they did not provide observations from two points in time. Area change estimates were based on the 1986 plot design and its remeasurement: the condition found at plot center in both inventories. These estimates thus reflect observations taken at 6,248 permanent points where land use, forest type, and other condition classifications were determined at two different times (1986 and 1998). The average plot expansion factor for change estimation was 3,700 acres, thus a plot that was observed to be timberland in 1986 and nonforest in 1998 represented 3,700 acres that changed from timberland to nonforest.

Volume

Estimates of volume per acre were made from the trees measured or modeled on all ground plots (remeasured, projected, and new) and the four strata defined by the 1998 GAP classification. These estimates came from measurements taken on the new 1998 plot design.

Estimates of volume per acre were multiplied by the area estimates to obtain estimates of total volume. Net cubic foot volumes were based on Hahn and Hansen (1991) for use in the Central States. For the Indiana inventory, the merchantable height equation presented in Hahn and Hansen (1991) was used in conjunction with Stone's equation (see Appendix I in Hahn and Hansen 1991) to estimate gross volume. This estimate was then corrected by species for variation in bark and cull volume to yield an estimate of net volume, using the coefficients presented in Hahn and Hansen (1991).

The Forest Service reports all board foot volume in International 1/4-inch rule. In Indiana, the Doyle log rule is commonly used. A comparison of board-foot volumes and board-foot to cubic-foot ratios for International 1/4-inch and Doyle log rules are listed in the conversion table in the middle of this page (Wenger 1984):

To determine the equivalent Doyle rule board foot contents of a log from the International 1/4-inch rule, use the conversion table at the bottom of this page. For example, a 12-inch diameter log that is 16 feet long has an International 1/4-inch volume of 95 board feet. To convert to Doyle, multiply 95 by 0.67 to obtain 64 board feet, which is the Doyle equivalent for a 12-inch 16-foot log.

Diameter (inches)	Volume in board feet		Board feet per cubic foot	
	Doyle	International 1/4"	Doyle	International 1/4"
6	4	20	0.92	4.59
8	16	40	2.23	5.59
10	36	65	3.38	6.11
12	64	95	4.32	6.42
14	100	135	5.08	5.85
16	144	180	5.69	7.11
18	196	230	6.22	7.30
20	256	290	6.65	7.53
25	441	460	7.47	7.80
30	676	675	8.06	8.05
35	961	925	8.50	8.18
40	1,296	1,220	8.83	8.32

Diameter of log small end (inches)	International 1/4" Rule to Doyle Rule Conversion Factors Length of log in feet					
	8	10	12	14	16	18
8	0.53	0.50	0.48	0.40	0.40	0.40
10	0.60	0.63	0.60	0.56	0.55	0.53
12	0.71	0.73	0.69	0.66	0.67	0.65
14	0.77	0.78	0.75	0.76	0.74	0.72
16	0.85	0.82	0.83	0.81	0.80	0.79
18	0.89	0.87	0.86	0.86	0.85	0.83
20	0.95	0.91	0.91	0.90	0.88	0.87
25	1.00	0.99	0.97	0.97	0.96	0.94
30	1.04	1.03	1.02	1.01	1.00	0.99
35	1.07	1.06	1.05	1.04	1.04	1.03
40	1.09	1.08	1.08	1.07	1.06	1.06

Net Growth, Mortality, and Removals

In this report, major components of changes in timber volume (growth, mortality, and removals) are reported for two different time periods. Average annual change is an estimate of the change that occurred between inventories. Current change is an estimate of the change that occurred in the final year of the inventory. Besides representing different periods in time, the methods used to estimate each component of change were different for the two periods.

Average Annual Net Growth and Mortality (1986-1997).—Estimates of average annual net growth and mortality per acre were made from the trees on plots that were measured in 1986 and then remeasured or modeled in 1998. The four strata defined by the 1998 GAP classification were used for stratification. All estimates of average annual net growth and mortality came from measurements taken using the 1986 plot design.

On remeasured plots, estimates of average annual net growth and mortality per acre came from the remeasured diameters of trees and from observation of trees that died between inventories, using methods presented by VanDeusen *et al.* (1986). Growth and mortality estimates for old undisturbed plots that were updated were derived in the same manner as remeasured plots. The STEMS growth model was adjusted by Survey Unit to meet local conditions, using data from the undisturbed remeasurement plots. As with volume, total growth and mortality estimates were obtained by multiplying the per acre estimates by area expansion factors.

Current Net Growth and Mortality (1997).—Estimates of current net growth and mortality per acre were made from the trees on all ground plots (remeasured, projected, and new) and the new 1998 plot design. The four strata defined by the 1998 GAP classification were used for stratification. Data from every ground plot were projected forward 1 year using the adjusted STEMS model. These 1-year projections were treated as 1-year remeasurements. Thus, current net growth and mortality estimates represent change over a different period (1997 rather than 1986-1997), use more plots (all plots rather than remeasured and projected plots), are based on a different plot design (1998 design rather than the 1986 design), and use a different method of observation (growth model projections rather than remeasurement and growth model projections) when they are contrasted with average annual net growth and mortality estimates.

Average Annual Removals (1986-1997).—Estimates of average annual removals per acre were made from the trees on plots that were measured in 1986 and then remeasured in 1998. The 1986 photo plot sample was used for stratification. All estimates of average annual removals came from measurements taken using the 1986 plot design. New plots and projected plots were not used to estimate average annual removals. These estimates were obtained from trees measured in the last survey and cut or otherwise removed from the timberland base. Because remeasurement plots were a subset of the total ground plots, and not all remeasurement plots had cutting, average annual removals estimates have greater sampling probability than volume, net growth, and mortality estimates.

Current Removals (1997).—Estimates of current removals were obtained from a mill survey that was independent of the inventory described here. In a mill survey, sawmills, pulp mills, and other primary timber users were sampled and responded to questions about the volume, source, and species of wood they received. This information was combined with estimates of logging utilization, land-use change, firewood removals, and other timber harvests to produce the estimates reported. The Indiana Department of Natural Resources—Division of Forestry provided valuable assistance in this effort by surveying all primary wood-using plants in the State. The methods used to estimate current removals are presented in Smith (1991). Because these estimates did not come from the plot measurement data, the procedures described above to obtain these estimates and associated sampling variabilities do not apply and cannot be obtained from the standard plot measurement FIA database. A special Timber Product Output database is maintained and can be used to obtain estimates of removals for any year (May 1998).

TREE AND LOG GRADES

Log and tree grades were based on the classification of external characteristics as indicators

of quality. Log grades and or tree grades were taken on every sawtimber-size tree measured on the new 1998 four-point plot. Sawtimber softwood trees were graded for quality and assigned a butt log grade. Sawtimber hardwood trees were graded for quality and assigned a tree grade. The volume yield by log grade or tree grade for this sample was used to distribute the volume of the ungraded trees (those on projected plots) by species group. In previous inventories, sawtimber trees were graded on only a third of sample plots.

Hardwood sawtimber trees were graded according to Hanks (1976). The best 12-foot section of the lowest 16-foot hardwood log was used for grading. Hardwood sawtimber trees that did not meet minimum tree grade specifications for grades 1 through 3 were assigned grade 4 according to Forest Service standard specifications for hardwood construction logs described by Rast *et al.* (1973).

Softwood sawtimber trees were graded according to specifications described by Ostrander and Brisbin (1971). For all softwoods, the first merchantable 16-foot log, or shorter lengths down to 12 feet, was used for grading.

Hardwood Tree Grade for Factory Lumber [a]

Grade factor	Tree grade 1	Tree grade 2	Tree grade 3
Length of grading zone (feet)	Butt 16	Butt 16	Butt 16
Length of grading section [b] (feet)	Best 12	Best 12	Best 12
D.b.h., minimum (inches)	16[c]	13	11
D.i.b., minimum at top of grading section (inches)	13[c] 16 20	11[d] 12	8
Clear cuttings (on the 3 best faces)[e]			
Length, minimum (feet)	7 5 3	3 3	2
Number on face (maximum)	2	2 3	Unlimited
Yield in face length (minimum)	5/6	4/6	3/6
Cull deduction (including crook and sweep, but excluding shake) maximum within grading section (percent)	9	f	50

[a] Hanks (1976)

[b] Whenever a 14- or 16-foot section of the butt 16-foot log is better than the best 12-foot section, the grade of the longer section will become the grade of the tree. This longer section, when used, is the basis for determining the grading factors such as diameter and cull deduction.

[c] In basswood and ash, d.i.b. at top of grading section must be 12 inches and d.b.h. must be 15 inches.

[d] Grade 2 trees can be 10 inches d.i.b. at top of grading section if they otherwise meet surface requirements for small grade 1's.

[e] A clear cutting is a portion of a face free of defects, extending the width of the face. A face is one-fourth of the surface of the grading section as divided lengthwise.

[f] Fifteen percent crook and sweep or 40 percent total cull deduction are permitted in grade 2 trees, if size and surface of grading section qualify as grade 1. If rot shortens the required clear cuttings to the extent of dropping the butt log to grade 2, do not drop the tree's grade to 3 unless the cull deduction for rot is greater than 40 percent.

Forest Service Standard Specifications for Hardwood Construction Logs [a, b]

Position in tree	Butts and uppers
Minimum diameter small end	8 inches
Minimum length without trim	8 feet
Clear cuttings	No requirements
Sweep allowance	1/4th of the diameter at the small end for each 8 feet of length.
Sound surface defects:	
Single knots	Any number, if no one knot has an average diameter above the callus in excess of one-third of the log diameter at point of occurrence.
Whorled knots	Any number, if the sum of knot diameters above the callus does not exceed one-third of the log diameter at point of occurrence.
Holes	Any number, provided none has a diameter over one-third of the log diameter at point of occurrence and none extends more than 3 inches into included timber[c].
Unsound surface defects:	Same requirements as for sound defects if they extend into included timber. No limit if they do not. Logs must be sound internally.

[a] Rast et al. (1973).

[b] These specifications are minimum for the class. If, from a group of logs, factory logs are selected first, thus leaving only nonfactory logs from which to select construction logs, then the quality range of the construction logs so selected is limited, and the class may be considered a grade. If selection for construction logs is given first priority, it may be necessary to subdivide the class into grades.

[c] Included timber is always square, and dimension is judged from small end.

Eastern White Pine Sawlog Grade Specifications [a]

Grading factor	Log grade 1	Log grade 2	Log grade 3	Log grade 4
1. Minimum scaling diameter (inches)	14[b]	6	6	6
2. Minimum log length (feet)	10[c]	8	8	8
3. Maximum weevil injury (number)	None	None	2 injuries [d]	No limit
4. Minimum face requirements	Two full length or four 50%[e] length good faces (in addition, log knots on balance of faces shall not exceed size limit of grade 2 logs).	**NO GOOD FACES REQUIRED** Maximum diameter of log knots on three best faces: **SOUND RED KNOTS** not to exceed 1/6 scaling diameter and 3" maximum; not to exceed 1/3 scaling diameter and 5" maximum **OVERGROWN/DEAD/BLACK KNOTS** not to exceed 1/12 scaling diameter and 1 1/2" max.; not to exceed 1/6 scaling diameter and 2 1/2" max.		Includes all logs not qualifying for No. 3 or better and having at least 1/3 of their gross volume in sound wood suitable for manufacture into standard lumber.
5. Maximum sweep or crook (%)	20	30	40	66 2/3
6. Maximum total scaling deduction (%)	50	50	50	66 2/3

After the tentative grade is established from face examination, the grade will be reduced whenever the following defects are evident:

7. Conks, punk knots, and pine borer damage on bark surface. [f]
   Degrade one grade if present on one face.
   Degrade two grades if present on two faces.
   Degrade three grades if present on three or more faces.
8. Log end defects: red rot, ring shake, heavy stain, and pine borer damage outside the heart center of log. [f] Consider log as having a total of 8 quarters (4 on each end) and degrade as indicated.
   Degrade one grade if present in 2 quarters of log ends.
   Degrade two grades if present in 3 or 4 quarters of log ends.
   Degrade three grades if present in 5 or more quarters of log ends.

a. Ostrander and Brisbin (1971)
b. 12- and 13-inch logs with four full-length good faces are acceptable.
c. 8-foot logs with four full-length good faces are acceptable.
d. 8-foot Number 3 logs limited to one weevil injury.
e. Minimum 50% length good face must be at least 6 feet.
f. Factors 7 and 8 are not cumulative (total degrade based on more serious of the two).
No log is to be degraded below grade 4 if net scale is at least one-third of gross scale.

Log Grades for All Other Softwood Logs

Grade 1

1. Trees must be 16 inches in diameter or larger, grading section 12 feet in length or longer, and with deduction for defect not over 30 percent of gross scale.

2. Trees must be at least 75 percent clear on each of three faces.

3. All knots outside clear cutting must be sound and not more than 2-1/2 inches in size.

Grade 2

1. Trees must be 12 inches in diameter or larger, grading section 12 feet in length or longer, and with a net scale after deduction for defect of at least 50 percent of the gross scale deducted for defect.

2. Trees must be at least 50 percent clear on each of three faces or 75 percent clear on two faces.

Grade 3

1. Trees must be 6 inches in diameter or larger, grading section 12 feet in length or longer, and with a net scale after deduction for defect of at least 50 percent of the gross contents of the log.

Note: Diameters are diameter inside bark at small end of grading section.
Percent clear refers to percent clear in one continuous section.

METRIC EQUIVALENTS

1 acre = 4,046.86 square meters or 0.405 hectare.
1,000 acres = 405 hectares.
1 cubic foot = 0.0283 cubic meter.
1 foot = 30.48 centimeters or 0.3048 meter.
1 inch = 25.4 millimeters, 2.54 centimeters, or 0.0254 meter.
1 pound = 0.454 kilograms.
1 ton = 0.907 metric tons.

TREE SPECIES GROUPS IN INDIANA

(Little 1981)

SOFTWOODS[2]

Eastern redcedar ..... *Juniperus virginiana*
Tamarack ..... *Larix laricina*
White spruce ..... *Picea glauca*
Jack pine ..... *Pinus banksiana*
Shortleaf pine ..... *P. echinata*
Red pine ..... *P. resinosa*
Eastern white pine ..... *P. strobus*
Scotch pine ..... *P. sylvestris*
Virginia pine ..... *P. virginiana*
Baldcypress ..... *Taxodium distichum*

HARDWOODS

Hard maples[1]
- Black maple ..... *Acer nigrum*
- Sugar maple ..... *A. saccharum*

Soft maples[2]
- Red maple ..... *A. rubrum*
- Silver maple ..... *A. saccharinum*

Birches
- Yellow birch[1] ..... *Betula alleghaniensis*
- Gray birch[2] ..... *B. populifolia*
- River birch[2] ..... *B. nigra*
- Paper birch[2] ..... *B. papyrifera*

Select hickories[1]
- Pecan ..... *Carya illinoensis*
- Shellbark hickory ..... *C. lacinosa*
- Shagbark hickory ..... *C. ovata*
- Mockernut hickory ..... *C. tomentosa*

Other hickories[1]
- Water hickory ..... *C. aquatica*
- Bitternut hickory ..... *C. cordiformis*
- Pignut hickory ..... *C. glabra*

American chestnut[2] ..... *Castanea dentata*
Hackberry [2] ..... *Celtis occidentalis*
Common persimmon[1] ..... *Diospyros virginiana*
American beech[1] ..... *Fagus grandifolia*

Ashes
- White ash[1] ..... *Fraxinus americana*
- Black ash[2] ..... *F. nigra*
- Green ash[1] ..... *F. pennsylvanica*
- Blue ash[1] ..... *F. quadrangulata*

Butternut[2] ..... *Juglans cinerea*
Black walnut[1] ..... *Juglans nigra*
Sweetgum[2] ..... *Liquidambar styraciflua*
Yellow-poplar[2] ..... *Liriodendron tulipifera*
Water tupelo[2] ..... *Nyssa aquatica*
Black tupelo[2] ..... *N. sylvatica* var. *sylvatica*
Swamp tupelo (blackgum)[2] ..... *N. sylvatica* var. *biflora*
Sycamore[2] ..... *Platanus occidentalis*

Populus[2]
- Balsam poplar ..... *Populus balsamifera*
- Eastern cottonwood ..... *P. deltoides*
- Bigtooth aspen ..... *P. grandidentata*
- Quaking aspen ..... *P. tremuloides*

Black cherry[2] ..... *Prunus serotina*

Select white oaks[1]
- White oak ..... *Quercus alba*
- Swamp white oak ..... *Q. bicolor*
- Bur oak ..... *Q. macrocarpa*
- Swamp chestnut oak ..... *Q. michauxii*
- Chinkapin oak ..... *Q. muehlenbergii*

Other white oaks[1]
- Overcup oak ..... *Q. lyrata*
- Chestnut oak ..... *Q. prinus*
- Post oak ..... *Q. stellata*

Select red oak[1]
- Cherrybark oak ..... *Q. falcata* var. *pagodifolia*
- Northern red oak ..... *Q. rubra*
- Shumard oak ..... *Q. shumardii* var. *shumardii*

Other red oaks[1]
- Scarlet oak ..... *Q. coccinea*
- Northern pin oak ..... *Q. ellipsoidalis*
- Southern pin oak ..... *Q. falcata*
- Shingle oak ..... *Q. imbricarta*
- Blackjack oak ..... *Q. marilandica*
- Pin oak ..... *Q. palustris*
- Black oak ..... *Q. velutina*

Black willow[2] ..... *Salix nigra*
Sassafras[2] ..... *Sassafras albidum*
American basswood[2] ..... *Tilia americana*

Elms
- Winged elm[2] ..... *Ulmus alata*
- American elm[2] ..... *U. americana*
- Siberian elm[2] ..... *U. pumila*
- Slippery elm[2] ..... *U. rubra*
- Rock elm[1] ..... *U. thomasii*

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[1]*This species or species group is considered a hard hardwood, with an average specific gravity greater than or equal to 0.50.*

[2]*This species or species group is considered a soft hardwood, with an average specific gravity of less than 0.50.*

Other hardwoods
- Boxelder[2] ..... *Acer negundo*
- Ohio buckeye[2] ..... *Aesculus glabra*
- Yellow buckeye[2] ..... *A. octandra*
- European alder[2] ..... *Alnus glutinosa*
- Northern catalpa[2] ..... *Catalpa speciosa*
- Flowering dogwood[1] ..... *Cornus florida*
- Honeylocust[1] ..... *Gleditsia triacanthos*
- Kentucky coffeetree[1] .... *Gymnocladus dioicus*
- Mulberry[2] ..... *Morus* spp.
- White poplar[2] ..... *Populus alba*
- Black locust[1] ..... *Robinia pseudoacacia*

Noncommercial species
- Ailanthus ..... *Ailanthus altissima*
- Pawpaw ..... *Asimina triloba*
- American hornbeam ..... *Carpinus caroliniana*
- Eastern redbud ..... *Cercis canadensis*
- Hawthorn ..... *Crataegus* spp.
- Osage-orange ..... *Maclura pomifera*
- Apple ..... *Malus* spp.
- Eastern hophornbeam ..... *Ostrya virginiana*
- Pincherry ..... *Prunus pennsylvanica*
- Wild plum ..... *Prunus* spp.
- Chokecherry ..... *P. virginiana*
- Peachleaf willow ..... *Salix amygdaloides*
- Diamond willow ..... *S. bebbiana*
- American mountain ash ... *Sorbus americana*

DEFINITION OF TERMS

Average annual mortality of growing stock.—The average cubic foot volume of sound wood in growing-stock trees that died in one year. Average annual mortality is the average for the years between inventories (1986 to 1997 in this report).

Average annual mortality of sawtimber.—The average board foot volume of sound wood in sawtimber trees that died in one year. Average annual mortality is the average for the years between inventories (1986 to 1997 in this report).

Average annual removals from growing stock.—The average net growing-stock volume in growing-stock trees removed annually for roundwood forest products, in addition to the volume of logging residues, and the volume of other removals. Average annual removals of growing stock are the average for the years between inventories (1986 to 1997 in this report) and are based on information obtained from remeasurement plots (see Survey Procedures in Appendix).

Average annual removals from sawtimber.—The average net board foot sawtimber volume of live sawtimber trees removed annually for roundwood forest products, in addition to the volume of logging residues, and the volume of other removals. Average annual removals of sawtimber are the average for the years between inventories (1986 to 1997 in this report) and are based on information obtained from remeasurement plots (see Survey Procedures in Appendix).

Average annual net growth of growing stock.—The annual change in cubic foot volume of sound wood in live sawtimber and poletimber trees, and the total volume of trees entering these classes through ingrowth, less volume losses resulting from natural causes. Average annual net growth of growing stock is the average for the years between inventories (1986 to 1997 in this report).

Average annual net growth of sawtimber.—The annual change in the board foot volume of live sawtimber trees, and the total volume of trees reaching sawtimber size, less volume losses resulting from natural causes. Average annual net growth of sawtimber is the average for the years between inventories (1986 to 1997 in this report).

Basal area.—Tree area in square feet of the cross section at breast height of a single tree. When the basal areas of all trees in a stand are summed, the result is usually expressed as square feet of basal area per acre.

Biomass.—The aboveground volume of all live trees (including bark but excluding foliage) reported in green tons (i.e., green weight). Biomass has four components:

Bole.—Biomass of a tree from 1 foot above the ground to a 4-inch top outside bark.

Tops and limbs.—Total biomass of tree from a 1-foot stump minus the bole.

1- to 5-inch trees.—Total aboveground biomass of a tree from 1 to 5 inches in diameter at breast height.

Stump.—Biomass of a tree 5 inches d.b.h. and larger from the ground to a height of 1 foot.

Bolts.—Roundwood logs of less than 8 feet in length that are converted into shingles, cooperage stock, dimension stock, blocks,

blanks, excelsior, etc. No minimum diameter limits. Does not include logs used for the manufacture of pulp or veneer.

Commercial species.—Tree species presently or prospectively suitable for industrial wood products. (Note: Excludes species of typically small size, poor form, or inferior quality such as hophornbeam, Osage-orange, and redbud.)

Cord.—One standard cord is 128 cubic feet of stacked wood, including bark and air space. Cubic feet can be converted to solid wood standard cords by dividing by 79.

Corporate.—Lands owned by a private corporation not in the business of operating primary wood-using plants.

County and municipal land.—Land owned by counties and local public agencies or municipalities, or land leased to these governmental units for 50 years or more.

Cropland.—Land under cultivation within the last 24 months; including cropland harvested, crop failures, cultivated summer fallow, idle cropland used only for pasture, orchards, active Christmas tree plantations indicated by annual shearing, nurseries, and land in soil improvement crops, but excluding land cultivated in developing improved pasture.

Cull.—Portions of a tree that are unusable for industrial wood products because of rot, missing or dead material, form, or other defect.

Current annual net growth of growing stock.—The annual change in volume of sound wood in live sawtimber and poletimber trees, and the total volume of trees entering these classes through ingrowth, less volume losses resulting from natural causes, reported for a single year (1997 in this report). Current net growth is based on an estimate of the current annual increment of each growing-stock tree in the inventory.

Current annual net growth of sawtimber.—The annual change in the volume of live sawtimber trees, and the total volume of trees reaching sawtimber size, less volume losses resulting from natural causes, reported for a single year (1997 in this report). Current net growth is based on an estimate of the current annual increment of each growing-stock tree in the inventory.

Current annual removals from growing stock.—The current net growing-stock volume in growing-stock trees removed annually for roundwood forest products, in addition to the volume of logging residues, and the volume of other removals. Current annual removals of growing stock are reported for a single year (1997 in this report); they are based on a survey of primary wood processing mills to determine removals for products and on information from remeasurement plots (see Survey Procedures in Appendix) to determine removals due to land-use change.

Current annual removals from sawtimber.—The current net board foot sawtimber volume of live sawtimber trees removed annually for roundwood forest products, in addition to the volume of logging residues, and the volume of other removals. Current annual removals of sawtimber are reported for a single year (1997 in this report); they are based on a survey of primary wood processing mills to determine removals for products and on information from remeasurement plots (see Survey Procedures in Appendix) to determine removals due to land-use change.

Diameter class.—A classification of trees based on diameter outside bark, measured at breast height 4.5 feet above the ground. (Note: d.b.h. is the common abbreviation for diameter at breast height.) Two-inch diameter classes are commonly used in Forest Inventory and Analysis, with the even inch the approximate midpoint for a class. For example, the 6-inch class includes trees 5.0 through 6.9 inches d.b.h.

Diameter at breast height (d.b.h.).—The outside bark diameter at 4.5 feet (1.37 m) above the forest floor on the uphill side of the tree. For determining breast height, the forest floor includes the duff layer that may be present, but does not include unincorporated woody debris that may rise above the ground line.

Forest industry land.—Land owned by companies or individuals operating primary wood-using plants.

Forest land.—Land at least 10 percent stocked by forest trees of any size, or formerly having had such tree cover, and not currently developed for nonforest use. (Note: Stocking is measured by comparing specified standards with basal area and/or number of trees, age or size, and spacing.) The minimum area for classification of forest land is 1 acre. Roadside, streamside, and windbreak strips of timber must have a crown width of at least 120 feet to qualify as forest land. Unimproved roads and trails or clearings in forest areas shall be classed as forest if less than 120 feet wide. Water bodies (rivers, streams, or lakes) less than 30 feet in width shall be classed as forest. Water bodies more than 30 feet in width are classified as water (see Tree, Land, Timberland, Reserved forest land, Other forest land, Stocking, and Water.)

Forest type.—A classification of forest land based on the species forming a plurality of live tree stocking. The associated species for each forest type are based on net volume of growing stock by species group. Major forest types are:

White pine.—Forests in which white pine comprises a plurality of the stocking. Species commonly associated with the white pine forest type in Indiana include red pine, yellow-poplar, Virginia pine, and shortleaf pine.

Shortleaf-Virginia pine.—Forests in which shortleaf and Virginia pine, singly or in combination, comprise a plurality of the stocking. Species commonly associated with the shortleaf-Virginia pine forest type in Indiana include yellow-poplar, hard maple, sycamore, and black cherry.

Eastern redcedar.—Forests in which eastern redcedar comprises a plurality of the stocking. Species commonly associated with the eastern redcedar forest type in Indiana include yellow-poplar, red oaks, and black cherry.

Eastern redcedar-hardwoods.—Forests in which hardwoods comprise a plurality of the stocking but in which eastern redcedar comprises between 25 and 50 percent of the stocking. Hardwood species commonly associated with the hardwood portion of this forest type in Indiana include ash, hickories, hard maple, white oaks, red oaks, and yellow-poplar.

Oak-pine.--Forests in which oaks and hickories, singly or in combination, comprise a plurality of the stocking but where pines or eastern redcedar comprises 25 to 50 percent of the stocking. Species commonly associated with the oak-pine forest type in Indiana include yellow-poplar, cottonwood, river birch, and sycamore.

Oak-hickory.—Forests in which upland oaks and hickories, singly or in combination, comprise a plurality of the stocking. Species commonly associated with the oak-hickory forest type in Indiana include yellow-poplar, ash, black cherry, cottonwood, and black walnut.

Oak-gum-cypress.—Forests in which tupelo, blackgum, sweetgum, oaks, or cypress, singly or in combination, comprise a plurality of the stocking. Species commonly associated with the oak-gum-cypress forest type in Indiana include yellow-poplar, cottonwood, ash, and sycamore.

Elm-ash-cottonwood.—Forests in which lowland elm, ash, red maple, silver maple, and cottonwood, singly or in combination, comprise a plurality of the stocking. Species commonly associated with the elm-ash-cottonwood forest type in Indiana include sycamore, yellow-poplar, red oak, and black walnut.

Maple-beech.—Forests in which hard maple, beech, American elm, and red maple, singly or in combination, comprise a plurality of the stocking. Species commonly associated with the maple-beech forest type in Indiana include white oaks, red oaks, hickories, yellow-poplar, and ash.

Cherry-ash-yellow poplar.—Forests in which black cherry, white ash, and yellow-poplar, singly or in combination, comprise a plurality of the stocking. Species commonly associated with the cherry-ash-yellow poplar forest type in Indiana include black walnut, American elm, white oak, and hard maples.

Aspen-birch.—Forests in which quaking aspen, bigtooth aspen, and paper birch, singly or in combination, comprise a plurality of the stocking. Species commonly associated with the aspen-birch forest type in Indiana include red oaks and yellow-poplar.

Growing-stock tree.—A live tree of commercial species that meets specified standards of size, quality, and merchantability. (Note: Excludes rough, rotten, and dead trees.)

Growing-stock volume.—Net volume in cubic feet of growing-stock trees 5.0 inches d.b.h. and over, from 1 foot above the ground to a minimum 4.0-inch top diameter outside bark of the central stem or to the point where the central stem breaks into limbs.

Hard hardwoods.—Hardwood species with an average specific gravity greater than 0.50 such as oaks, hard maple, hickories, and ash.

Hardwoods.—Dicotyledonous trees, usually broad-leaved and deciduous. (See Soft hardwoods and Hard hardwoods.)

Improved pasture.—Land currently improved for grazing by cultivating, seeding, irrigating, or clearing trees or brush and less than 16.7 percent stocked with trees.

Indian land.—Land held in trust by the United States for tribes or individual Indians.

Industrial wood.—All roundwood products except residential fuelwood.

Land.—*(a) Bureau of the Census.* Dry land and land temporarily or partly covered by water such as marshes, swamps, and river flood plains (omitting tidal flats below mean high tide); streams, sloughs, estuaries, and canals less than one-eighth of a statute mile wide; and lakes, reservoirs, and ponds less than 40 acres in area.

(b) Forest Inventory and Analysis. The same as the Bureau of the Census, except minimum width of streams, etc., is 120 feet and minimum size of lakes, etc., is 1 acre.

Live trees.—Growing-stock, rough, and rotten trees 1.0 inch d.b.h. and larger.

Log grade.—A log classification based on external characteristics as indicators of quality or value. Log grade was assigned to a sample of softwood sawtimber trees throughout the State during the 1998 inventory. Also see Tree grade. (See Appendix for specific grading factors used.)

Logging residue.—The unused portions of cut trees, plus unused trees killed by logging.

Marsh.—Nonforest land that characteristically supports low, generally herbaceous or shrubby vegetation, and that is intermittently covered with water.

Merchantable.—Refers to a pulpwood or saw-log section that meets pulpwood or saw log specifications, respectively.

Miscellaneous Federal land.—Federal land other than National Forest and land administered by the Bureau of Land Management or Bureau of Indian Affairs.

National Forest land.—Federal land that has been legally designated as National Forest or purchase units, and other land administered by the USDA Forest Service.

Net volume.—Gross volume less deductions for rot, sweep, or other defect affecting use for timber products.

Noncommercial species.—Tree species of typically small size, poor form, or inferior quality that normally do not develop into trees suitable for industrial wood products.

Nonforest land.—Land that has never supported forests, and land formerly forested where use for timber management is precluded by development for other uses. (Note: Includes areas used for crops, active Christmas tree plantations as indicated by annual shearing, orchards, nurseries, improved pasture, residential areas, city parks, improved roads of any width and adjoining clearings, powerline clearings of any width, and 1- to 40-acre areas of water classified by the Bureau of the Census as land.) If intermingled in forest areas, unimproved roads and nonforest strips must be more than 120 feet wide and more than 1 acre in area to qualify as nonforest land.

Nonforest land without trees.—Nonforest land with no live trees present.

Nonforest land with trees.—Nonforest land with one or more trees per acre at least 5 inches d.b.h.

Nonstocked land.—Timberland less than 10 percent stocked with all live trees.

Other forest land.—Forest land not capable of producing 20 cubic feet per acre per year of industrial wood crops under natural conditions and not associated with urban or rural development. Many of these sites contain tree species that are not currently used for industrial wood production or trees of poor form, small size, or inferior quality that are unfit for most industrial products. Unproductivity may be the result of adverse site conditions such as sterile soil, dry climate, poor drainage, high elevation, and rockiness. This land is not withdrawn from timber use.

Other removals.—Growing-stock trees removed but not used for products, or trees left standing but "removed" from the timberland classification by land-use change. Examples are removals from cultural operations such as timber stand improvement work and land clearing, and the standing volume on land classified originally as timberland but later designated as reserved from timber harvesting (such as a newly established State park).

Ownership size class.—The amount of timberland owned by one owner, regardless of the number of parcels.

Pasture.—Land presently used for grazing or under cultivation to develop grazing.

Physiographic class.—A measure of soil and water conditions that affect tree growth on a site. The physiographic classes are:

Xeric sites.—Very dry soils where excessive drainage seriously limits both growth and species occurrence. Example: eastern redcedar barrens.

Xeromesic sites.—Moderately dry soils where excessive drainage limits growth and species occurrence to some extent. Example: dry oak ridge.

Mesic sites.—Deep, well-drained soils. Growth and species occurrence are limited only by climate. Example: well-drained terraces of loamy soil.

Hydromesic sites.—Moderately wet soils where insufficient drainage or infrequent flooding limits growth and species occurrence to some extent. Example: moderately drained bottomland hardwood sites.

Hydric sites.—Very wet sites where excess water seriously limits both growth and species occurrence. Example: frequently flooded river bottoms.

Plant byproducts.—Plant residues used for products such as mulch, pulp chips, and fuelwood.

Plantation.—An artificially reforested area sufficiently productive to qualify as timberland. The planted species is not necessarily predominant. Christmas tree plantations, which are considered cropland, are not included.

Plant residues.—Wood and bark materials generated at manufacturing plants during production of other products.

Poletimber stand.— See Stand-size class.

Poletimber tree.—A live tree of commercial species at least 5.0 inches d.b.h., but smaller than sawtimber size.

Potential productivity class.—A classification of forest land in terms of inherent capacity to grow crops of industrial wood. The class identifies the potential growth in merchantable cubic feet/acre/year at culmination of mean annual increment of fully stocked natural stands.

Private individual land.—Privately owned land not owned by forest industry. This class includes the formerly used Farmer and Miscellaneous private classes.

Reserved forest land.—Forest land withdrawn from timber use through statute, administrative regulation, or designation. Note: Historically, Christmas tree plantations were classified as reserved forest land. However, Christmas tree plantations are now classified as cropland.

Rotten tree.—Live trees of commercial species that do not contain at least one 12-foot saw log or two saw logs 8 feet or longer, now or prospectively, and/or do not meet regional specifications for freedom from defect primarily because of rot; that is, when more than 50 percent of the cull volume in a tree is rotten.

Rough tree.—(a) Live trees of commercial species that do not contain at least one merchantable 12-foot saw log or two saw logs 8 feet or longer, now or prospectively, and/or

do not meet regional specifications for freedom from defect primarily because of roughness or poor form, and (b) all live trees of noncommercial species.

Roundwood products.—Logs, bolts, or other round sections (including chips from roundwood) cut from trees for industrial or consumer uses. (Note: Includes saw logs, veneer logs, and bolts; cooperage logs and bolts; pulpwood; fuelwood; pilings; poles; posts; hewn ties; mine timbers; and various other round, split, or hewn products.)

Salvable dead tree.—A standing or down dead tree considered merchantable by regional standards.

Sapling.—A live tree 1.0 to 5.0 inches d.b.h.

Sapling-seedling stand.—(See Stand-size class.)

Saw log.—A log meeting minimum standards of diameter, length, and defect, including logs at least 8 feet long, sound and straight and with a minimum diameter outside bark (d.o.b.) for softwoods of 7.0 inches (9.0 inches for hardwoods) or other combinations of size and defect specified by regional standards.

Saw-log portion.—That part of the bole of sawtimber trees between the stump and the saw-log top.

Saw-log top.—The point on the bole of sawtimber trees above which a saw log cannot be produced. The minimum saw-log top is 7.0 inches d.o.b. for softwoods and 9.0 inches d.o.b. for hardwoods.

Sawtimber stand.—(See Stand-size class.)

Sawtimber tree.—A live tree of commercial species containing at least a 12-foot saw log or two noncontiguous saw logs 8 feet or longer, and meeting regional specifications for freedom from defect. Softwoods must be at least 9.0 inches d.b.h. Hardwoods must be at least 11.0 inches d.b.h.

Sawtimber volume.—Net volume of the saw-log portion of live sawtimber in board feet, International 1/4-inch rule (unless specified otherwise), from stump to a minimum 7.0 inches top d.o.b. for softwoods and a minimum 9.0 inches top d.o.b. for hardwoods.

Seedling.—A live tree less than 1.0 inch d.b.h. that is expected to survive. Only softwood seedlings more than 6 inches tall and hardwood seedlings more than 1 foot tall are counted.

Short-log (rough tree).—A sawtimber-size tree of commercial species that contains at least one merchantable 8- to 11-foot saw log but not a 12-foot saw log.

Shrub.—A woody, perennial plant differing from a perennial herb in its persistent and woody stem(s) and less definitely from a tree in its lower stature and/or the general absence of a well-defined main stem. For this report, shrubs were separated somewhat arbitrarily into tall and low shrubs as follows:

Tall shrubs.—Normally taller than 1.6 to 3.2 feet (0.5 to 1.0 m).

Low shrubs.—Normally shorter than 1.6 to 3.2 feet (0.5 to 1.0 m). (Woody perennial vines, such as grape, were included with low shrubs.)

Shrub and tree seedling biomass.—The total aboveground weight of trees less than 1.0 inch in diameter and all shrubs.

Site index.—An expression of forest site quality based on the height of a free-growing dominant or codominant tree of a representative species in the forest type at age 50.

Soft hardwoods.—Hardwood species with an average specific gravity less than 0.50, such as cottonwood, red maple, basswood, and willow.

Softwoods.—Coniferous trees, usually evergreen, having needles or scale-like leaves.

Stand.—A group of trees on a minimum of 1 acre of forest land that is stocked by forest trees of any size.

Stand-age class.—A classification based on age of the main stand. Main stand refers to trees of the dominant forest type and stand-size class.

Stand-size class.—A classification of stocked (see Stocking) forest land based on the size

class of live trees on the area; that is, sawtimber, poletimber, or seedlings and saplings.

Sawtimber stands.—Stands with half or more of live tree stocking in sawtimber or poletimber trees, and with sawtimber stocking at least equal to poletimber stocking.

Poletimber stands.—Stands with half or more of live tree stocking in poletimber and/or sawtimber trees, and with poletimber stocking exceeding that of sawtimber.

Sapling-seedling stands.—Stands with more than half of the live tree stocking in saplings and/or seedlings.

State land.—Land owned by the State of Indiana or leased to it for 50 years or more.

Stocking.—The degree of occupancy of land by live trees, measured by basal area and/or the number of trees in a stand by size or age and spacing, compared to the basal area and/or number of trees required to fully utilize the growth potential of the land; that is, the stocking standard. A stocking percent of 100 indicates full use of the site and is equivalent to 80 square feet of basal area per acre in trees 5.0 inches d.b.h. and larger. In a stand of trees less than 5 inches d.b.h., a stocking percent of 100 would indicate that the present number of trees is sufficient to produce 80 square feet of basal area per acre when the trees reach 5 inches d.b.h. Stands are grouped into the following stocking classes:

Overstocked stands.—Stands in which stocking of live trees is 100 percent or more.

Fully stocked stands.—Stands in which stocking of live trees is from 60 to 99 percent.

Medium stocked stands.—Stands in which stocking of live trees is from 35 to 59 percent.

Poorly stocked stands.—Stands in which stocking of live trees is from 10 to 34 percent.

Nonstocked areas.—Timberland on which stocking of live trees is less than 10 percent.

Timber products output.—All timber products cut from roundwood and byproducts of wood manufacturing plants. Roundwood products include logs, bolts, or other round sections cut from growing-stock trees, cull trees, salvable dead trees, trees on nonforest land, noncommercial species, sapling-size trees, and limbwood. Byproducts from primary manufacturing plants include slabs, edgings, trimmings, miscuts, sawdust, shavings, veneer cores and clippings, and screenings of pulpmills that are used as pulpwood chips or other products.

Timberland.—Forest land that is producing, or is capable of producing, more than 20 cubic feet per acre per year of industrial wood crops under natural conditions, that is not withdrawn from timber use, and that is not associated with urban or rural development. Currently inaccessible and inoperable areas are included. (Timberland was formerly called commercial forest land.)

Tree.—A woody plant usually having one or more erect perennial stems, a stem diameter at breast height of at least 3 inches, a more or less definitely formed crown of foliage, and a height of at least 13 feet at maturity.

Tree biomass.—The total aboveground weight (including the bark but excluding the foliage) of all trees from 1 to 5 inches in d.b.h., and the total aboveground weight (including the bark but excluding the foliage) from a 1-foot stump for trees more than 5 inches in diameter.

Tree grade.—A classification of the lower 16 feet of the bole of standing trees based on external characteristics as indicators of the quality and quantity of lumber that could be produced from the tree. Tree grade was assigned to a sample of hardwood sawtimber trees during the 1998 inventory. Also see Log grade. (See Appendix for specific grading factors used.)

Tree size class.—A classification of trees based on diameter at breast height, including sawtimber trees, poletimber trees, saplings, and seedlings.

Upper stem portion.—That part of the bole of sawtimber trees above the saw-log top to a minimum top diameter of 4.0 inches d.o.b., or to the point where the central stem breaks into limbs.

Urban and other areas.—Areas within the legal boundaries of cities and towns; suburban areas developed for residential, industrial, or recreational purposes; school yards; cemeteries; roads; railroads; airports;

beaches; powerlines and other rights-of-way; or other nonforest land not included in any other specified land use class.

Urban forest land.—Land that would otherwise meet the criteria for timberland, but that is in an urban-suburban area surrounded by commercial, industrial, or residential development and not likely to be managed for the production of industrial wood products on a continuing basis. Wood removed would be for land clearing, fuelwood, or esthetic purposes. Such forest land may be associated with industrial, commercial, residential subdivision, industrial parks, golf course perimeters, airport buffer strips, and public urban parks that qualify as forest land.

Water.—*(a) Bureau of the Census.*—Permanent inland water surfaces, such as lakes, reservoirs, and ponds at least 40 acres in area; and streams, sloughs, estuaries, and canals at least one-eighth of a statute mile wide.

(b) Noncensus.—Permanent inland water surfaces, such as lakes, reservoirs, and ponds from 1 to 39.9 acres in area; and streams, sloughs, estuaries, and canals from 120 feet to one-eighth of a statute mile wide.

Wooded pasture.—Improved pasture with more than 16.7 percent stocking in live trees, but less than 25 percent stocking in growing-stock trees. Area is currently improved for grazing or there is other evidence of grazing.

Wooded strip.—An acre or more of natural continuous forest land that would otherwise meet survey standards for timberland except that it is less than 120 feet wide.

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(In thousand acres)

Forest Survey Unit and county/county group	Total land area [1]	Forest land				Other land [2]
		Total forest	Timberland	Reserved forest land	Other forest land	
Lower Wabash Unit						
Clay	228.9	42.1	42.1	--	--	186.8
Daviess, Knox	605.8	47.6	45.3	2.3	--	558.2
Gibson	312.9	43.3	43.3	--	--	269.6
Greene	347.0	128.8	128.8	--	--	218.2
Martin	215.2	133.4	130.5	2.8	--	81.8
Parke	284.7	96.8	93.5	3.3	--	187.9
Pike	215.2	71.3	67.5	3.8	--	143.9
Posey, Vanderburgh	411.7	61.5	52.5	9.1	--	350.2
Putnam	307.4	80.8	80.8	--	--	226.7
Sullivan	286.2	63.9	63.9	--	--	222.3
Vermillion	164.4	36.1	36.1	--	--	128.3
Vigo	258.1	53.9	53.9	--	--	204.2
Total	3,637.5	859.5	838.3	21.2	--	2,777.9
Knobs Unit						
Brown	199.9	163.9	136.9	27.0	--	36.0
Clark, Scott	362.0	132.8	132.8	--	--	229.2
Crawford	195.7	134.4	129.6	4.8	--	61.3
Dubois	275.3	77.2	77.2	--	--	198.1
Floyd,Harrison	405.2	145.1	145.1	--	--	260.1
Jackson	326.0	114.5	111.1	3.4	--	211.5
Lawrence	287.2	125.7	122.5	3.2	--	161.5
Monroe	252.4	136.7	121.8	14.9	--	115.7
Morgan	260.1	83.9	83.9	--	--	176.3
Orange	255.7	140.0	140.0	--	--	115.7
Owen	246.5	110.8	106.9	3.9	--	135.7
Perry	244.1	165.1	165.1	--	--	79.0
Spencer	255.2	53.9	50.1	3.8	--	201.2
Warrick	245.9	62.5	62.5	--	--	183.4
Washington	329.4	131.7	131.7	--	--	197.7
Total	4,140.6	1,778.2	1,717.3	61.0	--	2,362.4
Upland Flats Unit						
Dearborn	195.3	90.0	90.0	--	--	105.3
Fayette, Union	241.0	37.9	35.2	2.7	--	203.1
Franklin	247.1	113.2	105.3	7.9	--	133.9
Jefferson	231.3	91.5	88.9	2.6	--	139.8
Jennings	241.5	84.9	84.9	--	--	156.6
Ohio, Switzerland	197.1	100.1	100.1	--	--	97.0
Ripley	285.7	89.0	81.8	7.1	--	196.7
Total	1,639.0	606.5	586.2	20.3	--	1,032.5

(Table 1 continued on next page)

(Table 1 continued)

Forest Survey Unit and county/county group	Total land area [1]	Forest land				Other land [2]
		Total forest	Timberland	Reserved forest land	Other forest land	
Northern Unit						
AdHuWe	698.9	60.7	59.1	1.6	--	638.2
Allen	420.7	44.7	41.3	3.4	--	376.0
Bartholomew	260.4	44.2	44.2	--	--	216.2
BeFoWa	746.9	70.8	70.8	--	--	676.1
BlDeGrMa	911.8	54.5	54.5	--	--	857.4
BoClHaTi	951.3	45.6	41.6	3.9	--	905.7
CaTiWh	881.3	76.1	76.1	--	--	805.2
CaHoMiWa	956.7	90.7	90.7	--	--	866.0
DeHeRuWa	1,009.6	84.7	84.7	--	--	924.9
De Kalb, Steuben	429.9	51.6	51.6	--	--	378.2
ElNoWh	774.7	92.5	87.9	4.6	--	682.1
Fulton, Marshall	520.3	45.7	45.7	--	--	474.6
HaHeJoMaSh	1,180.0	74.1	67.8	6.3	--	1,105.9
JaLaNe	933.6	54.8	51.3	3.4	--	878.8
Jay, Randolph	535.5	48.2	48.2	--	--	487.4
Kosciusko	344.0	42.1	42.1	--	--	301.9
La Grange	242.9	47.2	47.2	--	--	195.7
La Porte	382.9	61.5	59.5	2.0	--	321.4
Montgomery	322.9	35.9	32.6	3.2	--	287.0
Porter	267.6	52.0	29.1	22.9	--	215.6
PuStSt	768.2	79.6	74.3	5.2	--	688.6
Total	13,540.3	1,257.1	1,200.5	56.6	--	12,283.2
All counties	22,957.4	4,501.3	4,342.3	159.1	--	18,456.0

All table cells without observations in the inventory sample are indicated by --. Cells with observations smaller than the precision reported in the table are shown as zero. Columns and rows may not add to their totals due to rounding.

[1] From U.S. Bureau of the Census, 1990.

[2] Includes 129.1 thousand acres of water according to FIA standards of area classification, but defined by the Bureau of the Census as land.

AdHuWe = Adams, Huntington and Wells Counties.
BeFoWa = Benton, Fountain and Warren Counties.
BlDeGrMa = Blackford, Delaware, Grant and Madison Counties.
BoClHaTi = Boone, Clinton, Hamilton and Tipton Counties.
CaTiWh = Carroll, Tippecanoe and White Counties.
CaHoMiWa = Cass, Howard, Miami and Wabash Counties.
DeHeRuWa = Decatur, Henry, Rush and Wayne Counties.
ElNoWh = Elkhart, Noble and Whitley Counties.
HaHeJoMaSh = Hancock, Hendricks, Johnson, Marion and Shelby Counties.
JaLaNe = Jasper, Lake and Newton Counties.
PuStSt = Pulaski, St. Joseph and Starke Counties.

Table 2. -- Area of timberland by Forest Survey Unit, county/county group, and ownership class, Indiana, 1998

(In thousand acres)

Forest Survey Unit and county/county group	All ownerships	Ownership class							
		National forest	Other federal	State	County and municipal	Indian	Forest industry	Corporate	Individual
Lower Wabash Unit									
Clay	42.1	--	--	--	--	--	--	5.4	36.7
Daviess, Knox	45.3	--	--	3.4	--	--	--	4.7	37.2
Gibson	43.3	--	--	4.0	--	--	--	11.5	27.8
Greene	128.8	--	6.0	9.2	--	--	3.0	11.1	99.5
Martin	130.5	8.2	46.1	4.2	--	--	--	17.3	54.7
Parke	93.5	--	3.3	3.3	--	--	3.3	11.5	72.1
Pike	67.5	--	--	9.4	--	--	--	34.0	24.1
Posey, Vanderburgh	52.5	--	--	--	--	--	3.6	--	48.9
Putnam	80.8	--	--	4.1	--	--	--	--	76.7
Sullivan	63.9	--	--	2.6	--	--	--	24.2	37.1
Vermillion	36.1	--	3.7	--	--	--	--	7.5	25.0
Vigo	53.9	--	--	--	--	--	--	11.9	42.1
Total	838.3	8.2	59.1	40.1	--	--	9.9	139.2	581.8
Knobs Unit									
Brown	136.9	15.8	8.6	37.1	--	--	2.9	7.9	64.7
Clark, Scott	132.8	--	2.3	21.7	4.6	--	--	9.2	95.1
Crawford	129.6	17.6	5.1	9.8	--	--	--	--	97.1
Dubois	77.2	0.4	3.8	15.1	--	--	--	7.6	50.2
Floyd,Harrison	145.1	--	--	26.6	--	--	--	6.7	111.7
Jackson	111.1	22.5	14.5	2.6	--	--	--	7.2	64.4
Lawrence	122.5	15.8	3.2	--	--	--	--	4.9	98.6
Monroe	121.8	4.1	8.9	9.7	--	--	--	13.0	86.2
Morgan	83.9	--	--	1.5	--	--	1.4	17.2	63.8
Orange	140.0	29.2	12.7	--	--	--	3.3	3.3	91.5
Owen	106.9	--	3.0	5.5	--	--	--	11.0	87.4
Perry	165.1	56.3	--	9.8	--	--	--	9.9	89.1
Spencer	50.1	--	--	--	--	--	--	--	50.1
Warrick	62.5	--	--	5.7	--	--	--	10.9	45.9
Washington	131.7	--	--	16.5	3.9	--	--	3.3	107.9
Total	1,717.3	161.5	62.1	161.8	8.5	--	7.6	112.1	1,203.8
Upland Flats Unit									
Dearborn	90.0	--	--	--	--	--	--	6.6	83.4
Fayette, Union	35.2	--	2.7	--	--	--	--	--	32.6
Franklin	105.3	--	--	--	--	--	--	--	105.3
Jefferson	88.9	--	3.6	2.6	--	--	--	2.6	80.1
Jennings	84.9	--	20.9	6.3	--	--	--	12.3	45.5
Ohio, Switzerland	100.1	--	--	--	--	--	--	1.2	98.9
Ripley	81.8	--	12.5	--	--	--	--	8.4	60.9
Total	586.2	--	39.7	8.8	--	--	--	31.0	506.6

(Table 2 continued on next page)

(Table 2 continued)

Forest Survey Unit and county/county group	All ownerships	Ownership class							
		National forest	Other federal	State	County and municipal	Indian	Forest industry	Corporate	Individual
Northern Unit									
AdHuWe	59.1	--	5.0	--	--	--	--	1.6	52.6
Allen	41.3	--	--	--	--	--	--	6.6	34.7
Bartholomew	44.2	--	16.0	--	--	--	--	--	28.2
BeFoWa	70.8	--	--	--	--	--	--	--	70.8
BlDeGrMa	54.5	--	--	3.5	--	--	--	9.2	41.8
BoClHaTi	41.6	--	--	--	--	--	--	--	41.6
CaTiWh	76.1	--	--	--	--	--	--	6.5	69.6
CaHoMiWa	90.7	--	9.3	--	--	--	--	--	81.4
DeHeRuWa	84.7	--	--	--	--	--	--	8.1	76.6
De Kalb, Steuben	51.6	--	--	--	--	--	--	8.5	43.2
ElNoWh	87.9	--	3.1	--	--	--	--	--	84.8
Fulton, Marshall	45.7	--	--	--	--	--	--	6.4	39.3
HaHeJoMaSh	67.8	--	6.6	7.6	--	--	--	1.1	52.5
JaLaNe	51.3	--	--	3.3	--	--	--	9.7	38.3
Jay, Randolph	48.2	--	--	--	--	--	--	7.3	40.9
Kosciusko	42.1	--	--	--	--	--	--	--	42.1
La Grange	47.2	--	--	3.4	--	--	--	3.4	40.4
La Porte	59.5	--	--	--	--	--	--	12.7	46.8
Montgomery	32.6	--	--	--	--	--	--	3.6	29.1
Porter	29.1	--	2.5	--	--	--	--	5.9	20.7
PuStSt	74.3	--	--	9.4	4.2	--	--	12.1	48.7
Total	1,200.5	--	42.5	27.1	4.2	--	--	102.7	1,024.0
All counties	4,342.3	169.8	203.3	237.9	12.7	--	17.4	385.0	3,316.2

All table cells without observations in the inventory sample are indicated by --. Cells with observations smaller than the precision reported in the table are shown as zero. Columns and rows may not add to their totals due to rounding.
AdHuWe = Adams, Huntington and Wells Counties.
BeFoWa = Benton, Fountain and Warren Counties.
BlDeGrMa = Blackford, Delaware, Grant and Madison Counties.
BoClHaTi = Boone, Clinton, Hamilton and Tipton Counties.
CaTiWh = Carroll, Tippecanoe and White Counties.
CaHoMiWa = Cass, Howard, Miami and Wabash Counties.
DeHeRuWa = Decatur, Henry, Rush and Wayne Counties.
ElNoWh = Elkhart, Noble and Whitley Counties.
HaHeJoMaSh = Hancock, Hendricks, Johnson, Marion and Shelby Counties.
JaLaNe = Jasper, Lake and Newton Counties.
PuStSt = Pulaski, St. Joseph and Starke Counties.

Table 3. -- Area of timberland by Forest Survey Unit, county/county group, and forest type group/local type, Indiana, 1998

(In thousand acres)

Forest Survey Unit and county/county group	All types	Forest type group/local type													
		White-red-jack pine	Loblolly-shortleaf pine	Oak-pine				Oak-hickory	Oak-gum-cypress	Elm-ash-cottonwood	Maple-beech-birch			Aspen-birch	Non-stocked
		White pine	Shortleaf-Virginia pine	Total	Eastern redcedar	Eastern redcedar-hardwood	Oak-pine	Oak-hickory	Oak-gum-cypress	Elm-ash-cottonwood	Total	Maple-beech	Cherry-ash-yellow poplar	Aspen-birch	Non-stocked
Lower Wabash Unit															
Clay	42.1	2.3	1.8	--	--	--	--	6.1	1.7	13.5	16.8	16.8	--	--	--
Daviess, Knox	45.3	--	--	--	--	--	--	7.3	--	21.3	16.7	15.2	1.4	--	--
Gibson	43.3	--	--	--	--	--	--	16.1	2.3	15.3	9.6	6.4	3.1	--	--
Greene	128.8	4.6	--	--	--	--	--	64.4	--	13.1	45.4	30.1	15.3	--	1.4
Martin	130.5	--	--	0.9	--	--	0.9	72.2	6.7	8.3	35.8	29.0	6.8	--	6.7
Parke	93.5	--	--	2.5	--	2.5	--	26.1	--	16.6	47.2	40.5	6.6	--	1.1
Pike	67.5	3.8	3.7	18.2	--	--	18.2	15.3	3.8	9.4	9.6	9.6	--	--	3.8
Posey, Vanderburgh	52.5	--	0.7	--	--	--	--	22.5	--	13.4	15.8	9.7	6.2	--	--
Putnam	80.8	--	--	--	--	--	--	12.5	--	2.1	66.2	50.4	15.8	--	--
Sullivan	63.9	--	--	2.6	--	--	2.6	23.0	--	21.8	16.4	15.5	0.8	--	0.1
Vermillion	36.1	--	--	--	--	--	--	17.6	--	7.3	11.2	11.2	--	--	--
Vigo	53.9	--	--	--	--	--	--	9.5	--	22.4	22.0	18.7	3.3	--	--
Total	838.3	10.6	6.2	24.2	--	2.5	21.7	292.6	14.5	164.5	312.5	253.2	59.4	--	13.1
Knobs Unit															
Brown	136.9	--	--	2.1	--	--	2.1	92.2	--	4.2	38.4	38.4	--	--	--
Clark, Scott	132.8	--	15.7	9.2	--	3.5	5.8	55.9	--	13.4	38.6	38.6	--	--	--
Crawford	129.6	--	--	7.2	3.3	3.9	--	78.5	--	2.1	41.8	36.0	5.8	--	--
Dubois	77.2	--	--	3.4	--	--	3.4	37.9	--	5.4	30.4	30.4	--	--	--
Floyd,Harrison	145.1	--	6.4	31.5	15.1	7.1	9.3	67.4	--	13.3	26.5	25.6	0.8	--	--
Jackson	111.1	1.1	0.5	4.2	--	0.7	3.5	45.6	--	20.4	37.1	30.0	7.1	2.0	0.2
Lawrence	122.5	1.6	--	--	--	--	--	52.8	--	8.8	59.1	49.4	9.7	--	0.2
Monroe	121.8	--	4.6	3.2	--	3.2	--	69.8	--	2.5	41.7	34.4	7.3	--	--
Morgan	83.9	2.9	--	--	--	--	--	29.9	--	15.5	32.5	23.0	9.5	2.8	0.2
Orange	140.0	--	1.3	15.1	--	7.5	7.5	51.4	--	2.9	69.1	66.5	2.6	--	0.3
Owen	106.9	--	--	--	--	--	--	16.5	--	7.9	82.6	75.0	7.6	--	--
Perry	165.1	3.0	7.5	6.3	0.3	2.6	3.3	100.5	--	3.3	44.5	43.2	1.4	--	--
Spencer	50.1	--	--	--	--	--	--	24.7	4.9	8.0	12.6	12.6	--	--	--
Warrick	62.5	--	0.7	2.9	--	--	2.9	39.8	2.9	12.6	3.6	2.1	1.4	--	0.1
Washington	131.7	--	8.0	16.1	5.5	7.2	3.3	58.9	--	8.2	40.5	31.7	8.8	--	--
Total	1,717.3	8.7	44.7	101.2	24.3	35.8	41.1	821.7	7.8	128.5	599.0	537.0	61.9	4.8	1.0
Upland Flats Unit															
Dearborn	90.0	--	--	12.0	2.9	9.1	--	22.1	--	13.0	42.9	19.4	23.5	--	--
Fayette, Union	35.2	--	--	2.0	--	2.0	--	3.8	--	10.0	19.5	7.8	11.7	--	--
Franklin	105.3	--	--	0.7	--	0.7	--	36.8	--	18.5	49.3	45.1	4.2	--	--
Jefferson	88.9	--	--	17.6	--	17.6	--	16.4	--	9.2	45.7	35.1	10.6	--	--
Jennings	84.9	--	--	5.4	--	2.8	2.7	28.6	--	18.4	32.4	28.8	3.6	--	0.1
Ohio, Switzerland	100.1	--	--	14.7	10.3	4.4	--	21.0	--	18.7	44.6	41.7	2.9	--	1.0
Ripley	81.8	--	--	5.0	--	5.0	--	31.3	1.4	3.4	40.7	38.7	2.0	--	--
Total	586.2	--	--	57.4	13.2	41.5	2.7	160.0	1.4	91.3	275.1	216.7	58.5	--	1.1

(Table 3 continued)

Forest Survey Unit and county/county group	All types	Forest type group/local type													
		White-red-jack pine	Loblolly-shortleaf pine	Oak-pine				Oak-hickory	Oak-gum-cypress	Elm-ash-cottonwood	Maple-beech-birch			Aspen-birch	Non-stocked
		White pine	Shortleaf-Virginia pine	Total	Eastern redcedar	Eastern redcedar-hardwood	Oak-pine	Oak-hickory	Oak-gum-cypress	Elm-ash-cottonwood	Total	Maple-beech	Cherry-ash-yellow poplar	Aspen-birch	Non-stocked
Northern Unit															
AdHuWe	59.1	--	--	--	--	--	--	12.8	--	18.2	28.0	21.0	6.9	--	0.2
Allen	41.3	--	--	3.4	--	--	3.4	15.7	--	3.9	18.3	18.3	--	--	--
Bartholomew	44.2	--	--	--	--	--	--	20.3	6.6	5.2	12.1	7.5	4.6	--	--
BeFoWa	70.8	--	--	--	--	--	--	38.4	--	--	31.8	19.5	12.4	--	0.5
BlDeGrMa	54.5	--	--	4.6	--	--	4.6	21.6	--	16.3	11.9	10.1	1.8	--	--
BoClHaTi	41.6	--	--	--	--	--	--	9.4	--	3.9	24.4	18.9	5.5	--	3.9
CaTiWh	76.1	--	--	--	--	--	--	18.9	--	18.0	39.3	34.9	4.4	--	--
CaHoMiWa	90.7	9.2	--	--	--	--	--	11.6	4.6	7.2	58.1	52.5	5.6	--	--
DeHeRuWa	84.7	1.4	--	--	--	--	--	15.6	--	25.1	42.6	35.8	6.9	--	0.0
De Kalb, Steuben	51.6	--	--	--	--	--	--	17.2	--	5.8	27.2	14.4	12.9	--	1.4
ElNoWh	87.9	--	--	1.2	--	--	1.2	3.0	--	31.5	51.3	45.9	5.4	--	0.9
Fulton, Marshall	45.7	--	--	--	--	--	--	17.6	--	22.3	5.8	--	5.8	--	--
HaHeJoMaSh	67.8	--	--	--	--	--	--	10.9	--	28.9	27.3	14.3	13.0	--	0.8
JaLaNe	51.3	--	0.1	--	--	--	--	27.1	3.5	5.7	12.3	--	12.3	--	2.5
Jay, Randolph	48.2	--	--	--	--	--	--	8.4	--	5.6	34.2	25.0	9.2	--	--
Kosciusko	42.1	--	--	--	--	--	--	3.5	--	16.4	22.2	16.7	5.5	--	--
La Grange	47.2	--	--	--	--	--	--	3.4	--	17.3	25.9	16.3	9.6	--	0.7
La Porte	59.5	--	--	2.5	--	--	2.5	18.9	--	12.8	24.5	9.2	15.3	--	0.8
Montgomery	32.6	--	--	--	--	--	--	8.9	1.2	13.8	8.8	8.8	--	--	--
Porter	29.1	--	--	--	--	--	--	9.6	--	4.7	14.8	12.3	2.5	--	--
PuStSt	74.3	--	--	--	--	--	--	36.7	3.2	13.2	14.0	5.7	8.2	2.4	5.0
Total	1,200.5	10.6	0.1	11.7	--	--	11.7	329.4	19.1	275.8	534.6	387.0	147.6	2.4	16.8
All counties	4,342.3	29.9	51.0	194.4	37.4	79.8	77.1	1,603.8	42.7	660.1	1,721.2	1,393.9	327.4	7.2	32.0

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AdHuWe = Adams, Huntington and Wells Counties.
BeFoWa = Benton, Fountain and Warren Counties.
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CaTiWh = Carroll, Tippecanoe and White Counties.
CaHoMiWa = Cass, Howard, Miami and Wabash Counties.
DeHeRuWa = Decatur, Henry, Rush and Wayne Counties.
ElNoWh = Elkart, Noble and Whitley Counties.
HaHeJoMaSh = Hancock, Hendricks, Johnson, Marion and Shelby Counties.
JaLaNe = Jasper, Lake and Newton Counties.
PuStSt = Pulaski, St. Joseph and Starke Counties.

Table 4. -- Area of timberland by Forest Survey Unit, county/county group, and stand-size class, Indiana, 1998

(In thousand acres)

Forest Survey Unit and county/county group	All stands	Stand-size class			
		Sawtimber	Poletimber	Sapling-seedling	Non-stocked
Lower Wabash Unit					
Clay	42.1	27.1	10.6	4.5	--
Daviess, Knox	45.3	34.8	3.4	7.1	--
Gibson	43.3	30.3	8.2	4.8	--
Greene	128.8	72.4	39.7	15.4	1.4
Martin	130.5	92.8	17.4	13.6	6.7
Parke	93.5	66.8	19.6	6.0	1.1
Pike	67.5	33.8	27.1	2.8	3.8
Posey, Vanderburgh	52.5	34.2	18.3	--	--
Putnam	80.8	61.5	19.2	--	--
Sullivan	63.9	48.5	15.2	--	0.1
Vermillion	36.1	28.2	7.9	--	--
Vigo	53.9	38.1	12.5	3.3	--
Total	838.3	568.6	199.1	57.4	13.1
Knobs Unit					
Brown	136.9	118.0	13.7	5.2	--
Clark, Scott	132.8	111.3	18.1	3.4	--
Crawford	129.6	91.1	34.1	4.4	--
Dubois	77.2	51.2	21.6	4.3	--
Floyd,Harrison	145.1	94.4	47.4	3.3	--
Jackson	111.1	88.2	19.1	3.6	0.2
Lawrence	122.5	94.9	20.3	7.2	0.2
Monroe	121.8	89.0	32.8	--	--
Morgan	83.9	65.8	15.7	2.1	0.2
Orange	140.0	99.6	26.9	13.3	0.3
Owen	106.9	79.3	20.0	7.6	--
Perry	165.1	114.3	39.2	11.6	--
Spencer	50.1	37.6	11.4	1.1	--
Warrick	62.5	26.7	27.3	8.4	0.1
Washington	131.7	109.8	17.6	4.2	--
Total	1,717.3	1,271.3	365.2	79.8	1.0
Upland Flats Unit					
Dearborn	90.0	41.2	45.9	2.9	--
Fayette, Union	35.2	26.2	9.0	--	--
Franklin	105.3	75.4	21.9	7.9	--
Jefferson	88.9	54.1	29.4	5.4	--
Jennings	84.9	68.8	12.4	3.6	0.1
Ohio, Switzerland	100.1	40.8	51.9	6.4	1.0
Ripley	81.8	58.2	17.5	6.1	--
Total	586.2	364.8	188.1	32.3	1.1

(Table 4 continued on next page)

(Table 4 continued)

Forest Survey Unit and county/county group	All stands	Stand-size class			
		Sawtimber	Poletimber	Sapling-seedling	Non-stocked
Northern Unit					
AdHuWe	59.1	28.6	25.0	5.2	0.2
Allen	41.3	34.5	6.8	--	--
Bartholomew	44.2	34.0	10.2	--	--
BeFoWa	70.8	49.8	10.0	10.4	0.5
BlDeGrMa	54.5	37.6	16.8	--	--
BoClHaTi	41.6	22.7	11.0	3.9	3.9
CaTiWh	76.1	51.0	13.7	11.4	--
CaHoMiWa	90.7	66.6	19.5	4.6	--
DeHeRuWa	84.7	77.0	7.7	--	0.0
De Kalb, Steuben	51.6	30.1	20.1	--	1.4
ElNoWh	87.9	79.0	8.0	--	0.9
Fulton, Marshall	45.7	31.7	10.5	3.4	--
HaHeJoMaSh	67.8	55.6	8.4	3.0	0.8
JaLaNe	51.3	21.7	23.7	3.4	2.5
Jay, Randolph	48.2	24.8	12.8	10.7	--
Kosciusko	42.1	33.3	4.4	4.4	--
La Grange	47.2	37.1	6.8	2.6	0.7
La Porte	59.5	41.9	16.7	--	0.8
Montgomery	32.6	18.0	11.4	3.2	--
Porter	29.1	21.5	4.2	3.4	--
PuStSt	74.3	50.5	17.8	1.0	5.0
Total	1,200.5	847.1	265.7	70.8	16.8
All counties	4,342.3	3,051.9	1,018.2	240.2	32.0

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AdHuWe = Adams, Huntington and Wells Counties.
BeFoWa = Benton, Fountain and Warren Counties.
BlDeGrMa = Blackford, Delaware, Grant and Madison Counties.
BoClHaTi = Boone, Clinton, Hamilton and Tipton Counties.
CaTiWh = Carroll, Tippecanoe and White Counties.
CaHoMiWa = Cass, Howard, Miami and Wabash Counties.
DeHeRuWa = Decatur, Henry, Rush and Wayne Counties.
ElNoWh = Elkart, Noble and Whitley Counties.
HaHeJoMaSh = Hancock, Hendricks, Johnson, Marion and Shelby Counties.
JaLaNe = Jasper, Lake and Newton Counties.
PuStSt = Pulaski, St. Joseph and Starke Counties.

Table 5. -- Area of timberland by Forest Survey Unit, county/county group, and potential productivity class, Indiana, 1998

(In thousand acres)

Forest Survey Unit and county/county group	All classes	Potential productivity class (cubic feet of growth per acre per year)					
		225+	165-224	120-164	85-119	50-84	20-49
Lower Wabash Unit							
Clay	42.1	1.7	4.9	11.8	21.0	--	2.7
Daviess, Knox	45.3	--	--	14.8	17.1	6.8	6.6
Gibson	43.3	--	1.0	18.7	14.5	9.2	--
Greene	128.8	3.0	3.5	32.2	50.3	36.4	3.5
Martin	130.5	3.5	--	38.8	42.9	40.5	4.8
Parke	93.5	2.4	1.3	34.1	24.0	19.7	12.0
Pike	67.5	12.3	--	14.3	29.3	7.5	4.1
Posey, Vanderburgh	52.5	--	8.0	10.5	19.9	14.1	--
Putnam	80.8	--	--	9.9	37.3	30.4	3.1
Sullivan	63.9	--	--	19.2	27.3	10.6	6.8
Vermillion	36.1	--	--	9.7	11.6	14.8	--
Vigo	53.9	1.3	--	15.4	21.3	8.4	7.6
Total	838.3	24.2	18.6	229.4	316.4	198.3	51.3
Knobs Unit							
Brown	136.9	3.1	--	14.6	44.0	56.7	18.5
Clark, Scott	132.8	--	--	30.4	49.1	32.6	20.7
Crawford	129.6	--	--	21.9	30.8	44.3	32.5
Dubois	77.2	4.9	3.7	20.1	9.0	31.7	7.7
Floyd,Harrison	145.1	5.0	--	29.6	44.9	55.4	10.1
Jackson	111.1	0.2	--	28.2	42.5	31.1	9.2
Lawrence	122.5	5.6	--	42.7	39.6	26.3	8.3
Monroe	121.8	--	--	22.8	45.6	35.2	18.2
Morgan	83.9	2.8	--	23.0	38.1	19.9	--
Orange	140.0	10.0	--	34.1	52.8	32.5	10.6
Owen	106.9	2.7	--	24.0	57.3	22.9	--
Perry	165.1	3.3	2.7	31.5	52.5	44.0	31.1
Spencer	50.1	--	--	7.6	25.7	14.2	2.8
Warrick	62.5	--	--	9.9	28.3	21.4	2.9
Washington	131.7	12.1	--	30.7	47.3	24.4	17.3
Total	1,717.3	49.8	6.4	371.1	607.4	492.7	189.9
Upland Flats Unit							
Dearborn	90.0	0.3	--	13.0	31.0	24.0	21.6
Fayette, Union	35.2	--	--	3.8	17.1	14.3	--
Franklin	105.3	--	3.6	28.3	35.4	32.2	5.8
Jefferson	88.9	3.5	2.6	16.7	35.9	18.0	12.3
Jennings	84.9	--	--	12.9	37.6	34.4	--
Ohio, Switzerland	100.1	--	--	18.7	31.5	24.6	25.4
Ripley	81.8	1.4	0.8	21.1	27.3	26.4	4.9
Total	586.2	5.2	6.9	114.4	215.8	173.9	70.0

(Table 5 continued on next page)

(Table 5 continued)

Forest Survey Unit and county/county group	All classes	Potential productivity class (cubic feet of growth per acre per year) 225+	165-224	120-164	85-119	50-84	20-49
Northern Unit							
AdHuWe	59.1	--	--	8.8	12.8	32.6	4.9
Allen	41.3	--	--	13.6	19.3	4.9	3.4
Bartholomew	44.2	--	2.7	5.8	23.6	10.8	1.3
BeFoWa	70.8	--	--	12.6	23.9	32.5	1.7
BlDeGrMa	54.5	4.6	--	11.0	32.0	6.8	--
BoClHaTi	41.6	--	0.6	7.9	18.3	13.4	1.5
CaTiWh	76.1	--	--	14.3	25.3	28.7	7.9
CaHoMiWa	90.7	0.9	--	21.4	34.3	23.4	10.8
DeHeRuWa	84.7	0.2	--	15.7	44.6	17.4	6.8
De Kalb, Steuben	51.6	--	--	11.7	28.0	5.4	6.5
ElNoWh	87.9	--	--	12.7	33.1	32.7	9.4
Fulton, Marshall	45.7	--	--	15.9	13.3	14.9	1.6
HaHeJoMaSh	67.8	--	4.3	2.2	47.5	13.8	--
JaLaNe	51.3	--	--	11.6	9.2	20.0	10.5
Jay, Randolph	48.2	--	--	12.2	17.3	12.9	5.9
Kosciusko	42.1	--	3.4	9.9	12.3	16.5	--
La Grange	47.2	3.4	--	--	28.1	3.1	12.6
La Porte	59.5	0.7	4.1	17.5	22.1	13.5	1.7
Montgomery	32.6	--	--	9.1	6.3	15.2	2.1
Porter	29.1	--	--	5.6	14.8	4.0	4.7
PuStSt	74.3	--	3.2	8.6	35.3	15.8	11.3
Total	1,200.5	9.8	18.2	228.2	501.5	338.3	104.5
All counties	4,342.3	89.0	50.2	943.1	1,641.2	1,203.2	415.6

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CaHoMiWa = Cass, Howard, Miami and Wabash Counties.
DeHeRuWa = Decatur, Henry, Rush and Wayne Counties.
ElNoWh = Elkart, Noble and Whitley Counties.
HaHeJoMaSh = Hancock, Hendricks, Johnson, Marion and Shelby Counties.
JaLaNe = Jasper, Lake and Newton Counties.
PuStSt = Pulaski, St. Joseph and Starke Counties.

Table 6. -- Area of timberland by Forest Survey Unit, county/county group, and stocking class of growing-stock trees [1], Indiana, 1998

(In thousand acres)

Forest Survey Unit and county/county group	All classes	Stocking class of growing-stock trees				
		Nonstocked [2]	Poorly stocked	Moderately stocked	Fully stocked	Over-stocked
Lower Wabash Unit						
Clay	42.1	--	10.7	5.4	22.2	3.8
Daviess, Knox	45.3	--	4.1	14.4	17.4	9.4
Gibson	43.3	1.0	11.4	12.4	15.5	3.0
Greene	128.8	4.2	29.1	40.1	43.6	11.9
Martin	130.5	13.7	16.1	29.3	63.1	8.3
Parke	93.5	2.0	16.4	32.1	32.0	11.0
Pike	67.5	7.5	0.9	14.3	41.0	3.8
Posey, Vanderburgh	52.5	3.9	11.2	16.2	17.5	3.7
Putnam	80.8	1.2	11.6	11.3	51.0	5.6
Sullivan	63.9	0.4	15.9	10.5	33.4	3.6
Vermillion	36.1	--	1.1	10.7	24.4	--
Vigo	53.9	1.3	9.0	18.3	16.8	8.5
Total	838.3	35.3	137.6	215.0	377.9	72.5
Knobs Unit						
Brown	136.9	--	9.9	29.6	87.5	9.9
Clark, Scott	132.8	0.9	24.5	53.6	44.7	9.2
Crawford	129.6	3.8	19.6	29.3	70.1	6.7
Dubois	77.2	--	5.0	30.5	35.3	6.4
Floyd,Harrison	145.1	--	24.3	35.8	76.8	8.2
Jackson	111.1	0.2	13.9	34.7	49.0	13.4
Lawrence	122.5	3.9	13.8	39.6	49.2	15.9
Monroe	121.8	0.7	8.8	30.1	75.6	6.7
Morgan	83.9	0.2	11.3	17.8	40.6	13.9
Orange	140.0	0.3	27.8	43.3	60.1	8.6
Owen	106.9	1.7	13.7	45.7	36.3	9.5
Perry	165.1	1.6	20.0	58.0	73.7	11.8
Spencer	50.1	--	1.1	30.9	18.1	--
Warrick	62.5	0.1	20.7	22.0	14.7	5.0
Washington	131.7	1.1	11.4	37.3	66.7	15.2
Total	1,717.3	14.5	225.8	538.1	798.5	140.4
Upland Flats Unit						
Dearborn	90.0	12.6	30.0	22.7	21.7	3.0
Fayette, Union	35.2	--	15.3	8.0	11.9	--
Franklin	105.3	0.7	19.6	34.8	41.2	8.9
Jefferson	88.9	1.9	16.7	35.0	34.8	0.5
Jennings	84.9	4.5	22.2	9.7	42.6	5.9
Ohio, Switzerland	100.1	10.0	40.6	30.2	12.5	6.8
Ripley	81.8	0.7	2.0	29.7	44.1	5.4
Total	586.2	30.3	146.5	170.1	208.9	30.4

(Table 6 continued on next page)

(Table 6 continued)

Forest Survey Unit and county/county group	All classes	Stocking class of growing-stock trees				
		Nonstocked [2]	Poorly stocked	Moderately stocked	Fully stocked	Over-stocked
Northern Unit						
AdHuWe	59.1	0.8	23.4	5.8	26.8	2.3
Allen	41.3	--	4.1	8.3	28.1	0.8
Bartholomew	44.2	--	8.8	9.9	21.0	4.5
BeFoWa	70.8	0.5	17.2	12.9	22.5	17.7
BlDeGrMa	54.5	0.6	12.7	13.5	25.1	2.5
BoClHaTi	41.6	7.9	8.5	11.3	13.9	--
CaTiWh	76.1	2.3	24.7	28.6	14.4	6.2
CaHoMiWa	90.7	1.4	16.5	30.9	35.4	6.6
DeHeRuWa	84.7	1.3	18.8	15.8	35.0	13.8
De Kalb, Steuben	51.6	1.4	3.0	21.5	21.6	4.1
ElNoWh	87.9	0.9	28.5	30.5	25.7	2.3
Fulton, Marshall	45.7	1.4	15.2	17.0	8.8	3.3
HaHeJoMaSh	67.8	0.8	22.3	9.9	28.9	6.0
JaLaNe	51.3	3.4	18.1	16.2	13.5	0.1
Jay, Randolph	48.2	--	19.4	0.9	22.0	5.9
Kosciusko	42.1	--	8.8	14.1	9.0	10.2
La Grange	47.2	1.1	17.2	19.2	9.7	--
La Porte	59.5	6.2	19.5	18.1	15.1	0.6
Montgomery	32.6	0.9	4.7	14.7	10.5	1.8
Porter	29.1	--	16.2	4.9	6.8	1.1
PuStSt	74.3	10.6	32.1	6.0	16.6	9.0
Total	1,200.5	41.5	339.7	309.9	410.5	98.9
All counties	4,342.3	121.6	849.6	1,233.2	1,795.7	342.1

All table cells without observations in the inventory sample are indicated by --. Cells with observations smaller than the precision reported in the table are shown as zero. Columns and rows may not add to their totals due to rounding.

[1] This table is based on the stocking percent of growing-stock trees, rather than that of "live" trees. For this table, to use the definition of stocking found in the Appendix, replace the term "live trees" with "growing-stock trees."

[2] Area of nonstocked in this table and in table 8 differs from that in other tables in this report because this table includes land stocked only with growing-stock trees, rather than with "live" trees.

AdHuWe = Adams, Huntington and Wells Counties.
BeFoWa = Benton, Fountain and Warren Counties.
BlDeGrMa = Blackford, Delaware, Grant and Madison Counties.
BoClHaTi = Boone, Clinton, Hamilton and Tipton Counties.
CaTiWh = Carroll, Tippecanoe and White Counties.
CaHoMiWa = Cass, Howard, Miami and Wabash Counties.
DeHeRuWa = Decatur, Henry, Rush and Wayne Counties.
ElNoWh = Elkart, Noble and Whitley Counties.
HaHeJoMaSh = Hancock, Hendricks, Johnson, Marion and Shelby Counties.
JaLaNe = Jasper, Lake and Newton Counties.
PuStSt = Pulaski, St. Joseph and Starke Counties.

Table 7. -- Area of timberland by forest type group/local type and ownership class, Indiana, 1998

(In thousand acres)

Forest type group by local type	Ownership class										
		Public					Private				
	All ownerships	Total public	National forest	Other federal	State	County and municipal	Total private	Indian	Forest industry	Corporate	Individual
White-red-jack pine											
White pine	29.9	4.3	2.8	--	1.5	--	25.6	--	--	10.5	15.1
Total	29.9	4.3	2.8	--	1.5	--	25.6	--	--	10.5	15.1
Loblolly-shortleaf pine											
Shortleaf-Virginia pine	51.0	14.1	8.2	--	5.9	--	36.9	--	--	--	36.9
Total	51.0	14.1	8.2	--	5.9	--	36.9	--	--	--	36.9
Oak-pine											
Eastern redcedar	37.4	0.3	0.3	--	--	--	37.1	--	--	3.4	33.7
Eastern redcedar-hardwood	79.8	8.6	4.3	2.3	0.8	1.1	71.2	--	--	6.4	64.8
Oak-pine	77.1	15.6	4.9	1.4	9.4	--	61.5	--	--	13.7	47.8
Total	194.4	24.6	9.5	3.7	10.2	1.1	169.8	--	--	23.5	146.3
Oak-hickory											
Oak-hickory	1,603.8	341.2	91.1	97.9	148.8	3.4	1,262.6	--	5.1	130.5	1,127.0
Total	1,603.8	341.2	91.1	97.9	148.8	3.4	1,262.6	--	5.1	130.5	1,127.0
Oak-gum-cypress											
Oak-gum-cypress	42.7	9.9	--	9.9	--	--	32.8	--	--	5.9	26.9
Total	42.7	9.9	--	9.9	--	--	32.8	--	--	5.9	26.9
Elm-ash-cottonwood											
Elm-ash-cottonwood	660.1	60.9	12.3	29.3	19.4	--	599.2	--	2.9	64.8	531.4
Total	660.1	60.9	12.3	29.3	19.4	--	599.2	--	2.9	64.8	531.4
Maple-beech-birch											
Maple-beech	1,393.9	121.6	38.5	45.4	36.7	1.0	1,272.3	--	9.5	118.0	1,144.8
Cherry-ash-yellow poplar	327.4	40.2	5.1	16.7	15.4	2.9	287.2	--	--	24.6	262.6
Total	1,721.2	161.7	43.6	62.1	52.1	3.9	1,559.5	--	9.5	142.6	1,407.4
Aspen-birch											
Aspen-birch	7.2	2.0	2.0	--	--	--	5.2	--	--	2.8	2.4
Total	7.2	2.0	2.0	--	--	--	5.2	--	--	2.8	2.4
Nonstocked	32.0	4.8	0.3	0.4	--	4.2	27.1	--	--	4.4	22.8
All types	4,342.3	623.7	169.8	203.3	237.9	12.7	3,718.6	--	17.4	385.0	3,316.2

All table cells without observations in the inventory sample are indicated by --. Cells with observations smaller than the precision reported in the table are shown as zero. Columns and rows may not add to their totals due to rounding.

Table 8. -- Area of timberland by ownership class and stocking class of growing-stock trees[1], Indiana, 1998

(In thousand acres)

Ownership class	All classes	Stocking class of growing-stock trees				
		Nonstocked[2]	Poorly stocked	Moderately stocked	Fully stocked	Over-stocked
Public						
National forest	169.8	1.9	12.6	31.5	101.4	22.4
Other federal	203.3	4.9	45.7	53.5	92.1	7.1
State	237.9	1.9	29.0	29.1	152.2	25.8
County and municipal	12.7	4.2	- -	4.6	2.9	1.0
Total	623.7	12.9	87.3	118.7	348.6	56.2
Private						
Forest industry	17.4	3.6	3.3	3.3	6.0	1.3
Corporate	385.0	14.8	66.7	91.8	169.6	42.1
Individual	3,316.2	90.3	692.3	1,019.4	1,271.5	242.6
Total	3,718.6	108.7	762.3	1,114.5	1,447.2	285.9
All ownerships	4,342.3	121.6	849.6	1,233.2	1,795.7	342.1

All table cells without observations in the inventory sample are indicated by --. Cells with observations smaller than the precision reported in the table are shown as zero. Columns and rows may not add to their totals due to rounding.

[1] This table is based on the stocking percent of growing-stock trees, rather than that of "live" trees. For this table, to use the definition of stocking found in the Appendix, replace the term "live trees" with "growing-stock trees."

[2] Area of nonstocked in this table and in table 6 differs from that in other tables in this report because this table includes land stocked only with growing-stock trees, rather than with "live" trees.

Table 9. -- Area of timberland by forest type group/local type and stand-size class, Indiana, 1998

(In thousand acres)

Forest type group and local type	All stands	Stand-size class			
		Sawtimber	Poletimber	Sapling-seedling	Non-stocked
White-red-jack pine					
White pine	29.9	22.2	7.7	--	--
Total	29.9	22.2	7.7	--	--
Loblolly-shortleaf pine					
Shortleaf-Virginia pine	51.0	39.1	10.1	1.8	--
Total	51.0	39.1	10.1	1.8	--
Oak-pine					
Eastern redcedar	37.4	18.2	19.2	--	--
Eastern redcedar-hardwood	79.8	37.8	32.5	9.5	--
Oak-pine	77.1	36.2	27.9	13.1	--
Total	194.4	92.3	79.6	22.5	--
Oak-hickory					
Oak-hickory	1,603.8	1,195.7	339.3	68.8	--
Total	1,603.8	1,195.7	339.3	68.8	--
Oak-gum-cypress					
Oak-gum-cypress	42.7	29.7	11.8	1.1	--
Total	42.7	29.7	11.8	1.1	--
Elm-ash-cottonwood					
Elm-ash-cottonwood	660.1	467.5	156.6	36.0	--
Total	660.1	467.5	156.6	36.0	--
Maple-beech-birch					
Maple-beech	1,393.9	1,024.5	295.8	73.6	--
Cherry-ash-yellow poplar	327.4	173.8	117.2	36.4	--
Total	1,721.2	1,198.3	413.0	110.0	--
Aspen-birch					
Aspen-birch	7.2	7.2	--	--	--
Total	7.2	7.2	--	--	--
Nonstocked	32.0	--	--	--	32.0
All types	4,342.3	3,051.9	1,018.2	240.2	32.0

All table cells without observations in the inventory sample are indicated by --. Cells with observations smaller than the precision reported in the table are shown as zero. Columns and rows may not add to their totals due to rounding.

Table 10. -- Number of all live trees on timberland by species group and diameter class, Indiana, 1998

(In thousand trees)

Species group	All classes	Diameter class (inches at breast height)											
		1.0-2.9	3.0-4.9	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
Softwoods													
Jack pine	659	--	--	57	256	237	50	60	--	--	--	--	--
Red pine	2,120	--	419	310	681	517	148	46	--	--	--	--	--
White pine	13,376	7,016	703	756	1,403	1,382	1,139	513	263	157	43	--	--
Shortleaf pine	4,087	147	143	616	1,069	987	699	295	103	10	17	--	--
Virginia pine	15,640	3,433	2,215	2,923	3,054	1,861	1,090	553	305	161	40	5	--
White spruce	21	--	--	--	21	--	--	--	--	--	--	--	--
Tamarack	102	--	--	--	102	--	--	--	--	--	--	--	--
Baldcypress	198	--	--	33	33	17	33	33	17	17	17	--	--
Eastern redcedar	81,817	48,815	19,433	6,791	3,792	1,834	716	282	117	30	10	--	--
Other softwoods	3,931	2,906	--	315	440	223	46	--	--	--	--	--	--
Total softwoods	121,952	62,317	22,912	11,802	10,850	7,057	3,921	1,782	805	374	127	5	--
Hardwoods													
Select white oak	70,389	23,489	11,234	6,125	4,909	4,879	4,413	4,052	3,546	2,820	1,883	2,741	298
Other white oak	9,033	1,410	1,160	512	642	892	975	1,104	882	772	401	283	--
Select red oak	29,059	8,185	6,351	2,299	1,678	2,259	1,922	1,581	1,310	1,133	859	1,193	290
Other red oak	60,025	18,296	13,481	4,291	4,250	4,208	3,450	3,605	2,482	2,204	1,395	2,143	220
Select hickory	51,249	17,981	10,944	5,439	5,148	3,533	3,440	2,027	1,366	923	182	264	2
Other hickory	52,346	13,431	11,839	5,116	5,826	4,941	4,153	3,137	1,892	1,025	406	548	32
Basswood	21,885	11,950	3,906	2,221	1,149	861	525	359	458	125	109	191	31
Beech	57,574	38,779	8,177	2,454	1,901	1,426	782	918	699	794	500	890	255
Yellow birch	1,058	529	529	--	--	--	--	--	--	--	--	--	--
Hard maple	316,104	207,710	51,637	19,399	13,029	8,304	5,642	3,963	2,542	1,585	995	1,194	104
Soft maple	149,023	84,425	31,822	10,570	7,890	4,915	2,978	2,199	1,487	961	642	991	143
Elm	220,817	147,926	41,943	14,641	8,259	3,912	2,060	939	609	156	99	272	--
Black ash	8,566	5,775	1,817	174	368	190	146	26	37	26	--	7	--
White & green ash	138,435	77,154	20,973	11,233	9,250	6,450	4,572	3,553	2,057	1,498	935	673	87
Sycamore	20,387	6,619	2,092	2,091	1,872	2,022	1,376	1,310	695	576	574	973	188
Cottonwood	9,872	4,189	1,693	327	471	693	460	337	503	147	95	706	253
Willow	3,706	1,138	627	461	479	446	186	137	125	59	41	7	--
Hackberry	56,882	36,456	10,703	3,554	2,749	1,223	792	499	384	233	90	194	4
Balsam poplar	17	--	--	--	--	--	17	--	--	--	--	--	--
Bigtooth aspen	7,458	4,429	956	326	397	375	291	252	226	131	57	18	--
Quaking aspen	1,870	1,333	--	309	76	84	34	--	24	--	--	9	--
Paper birch	20	--	--	--	--	--	20	--	--	--	--	--	--
River birch	7,424	1,590	2,367	1,422	877	655	286	122	84	--	21	--	--
Sweetgum	28,119	16,943	3,592	2,374	1,801	1,138	896	615	320	208	134	99	--
Tupelo	52,961	37,367	8,967	2,685	1,579	956	511	504	261	81	13	38	--
Black cherry	132,371	87,790	20,933	8,977	5,767	3,859	2,020	1,479	760	401	217	165	3
Black walnut	30,269	8,109	5,499	4,187	3,448	2,508	2,664	1,626	1,153	712	217	140	4
Butternut	492	--	--	180	125	57	53	65	12	--	--	--	--
Yellow-poplar	83,339	39,662	12,655	6,198	5,645	4,638	3,703	3,160	2,711	1,939	1,301	1,621	106
Other hardwoods	444,514	303,994	88,018	26,121	12,367	6,268	3,164	2,257	992	745	287	298	4
Total hardwoods	2,065,263	1,206,658	373,915	143,685	101,952	71,694	51,529	39,825	27,618	19,256	11,453	15,656	2,022
Noncommercial species	215,504	169,422	36,061	6,486	2,140	789	220	177	145	39	5	--	19
All species	2,402,719	1,438,397	432,887	161,972	114,942	79,540	55,671	41,785	28,567	19,670	11,584	15,661	2,041

All table cells without observations in the inventory sample are indicated by --. Cells with observations smaller than the precision reported in the table are shown as zero. Columns and rows may not add to their totals due to rounding.

Table 11. -- Number of growing-stock trees on timberland by species group and diameter class, Indiana, 1998

(In thousand trees)

Species group	All classes	Diameter class (inches at breast height)											
		1.0-2.9	3.0-4.9	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
Softwoods													
Jack pine	577	--	--	57	201	210	50	60	--	--	--	--	--
Red pine	2,120	--	419	310	681	517	148	46	--	--	--	--	--
White pine	13,209	7,016	703	756	1,315	1,382	1,061	513	263	157	43	--	--
Shortleaf pine	3,908	147	143	616	1,017	859	699	295	103	10	17	--	--
Virginia pine	13,852	3,433	883	2,680	3,001	1,733	1,090	525	305	161	40	--	--
Baldcypress	182	--	--	33	17	17	33	33	17	17	17	--	--
Eastern redcedar	75,604	47,683	16,890	5,762	3,170	1,306	489	196	77	20	10	--	--
Other softwoods	4,009	2,906	--	301	550	205	46	--	--	--	--	--	--
Total softwoods	113,460	61,185	19,037	10,516	9,952	6,228	3,616	1,669	765	364	127	--	--
Hardwoods													
Select white oak	64,439	22,149	9,119	5,578	4,474	4,606	4,139	3,794	3,353	2,714	1,775	2,518	219
Other white oak	8,647	1,410	1,160	417	632	821	896	1,009	853	772	401	276	--
Select red oak	28,169	8,185	6,351	2,206	1,425	2,163	1,843	1,517	1,235	1,108	792	1,072	271
Other red oak	56,886	17,855	12,645	4,042	3,977	4,115	3,227	3,265	2,300	2,085	1,293	1,947	136
Select hickory	48,976	17,981	9,851	5,256	4,753	3,449	3,276	1,892	1,299	872	169	178	--
Other hickory	49,169	13,431	10,252	4,707	5,493	4,755	3,913	2,993	1,814	949	354	488	20
Basswood	16,723	10,681	965	1,802	1,013	758	481	281	419	91	96	132	3
Beech	53,696	37,532	8,177	2,010	1,702	1,104	577	728	550	529	301	461	27
Yellow birch	1,058	529	529	--	--	--	--	--	--	--	--	--	--
Hard maple	299,624	201,064	48,104	17,352	11,822	7,556	4,931	3,675	2,220	1,266	818	762	56
Soft maple	134,629	82,150	26,414	8,707	6,487	4,059	2,204	1,599	1,103	632	534	684	57
Elm	204,121	144,007	36,169	11,125	6,488	3,096	1,641	769	379	147	65	236	--
Black ash	7,068	5,775	448	144	347	162	126	26	37	--	--	4	--
White & green ash	128,457	76,167	18,783	8,984	7,524	5,449	3,947	3,028	1,730	1,312	887	585	61
Sycamore	18,953	6,619	2,092	1,874	1,646	1,772	1,159	1,063	667	508	542	885	126
Cottonwood	9,587	4,189	1,693	259	471	558	460	294	503	134	95	687	244
Willow	2,755	1,138	627	290	266	144	51	82	83	33	41	--	--
Hackberry	49,890	33,849	8,478	2,343	2,211	1,155	643	430	359	201	90	130	--
Bigtooth aspen	7,371	4,429	956	326	351	334	291	252	226	131	57	18	--
Quaking aspen	1,831	1,333	--	271	76	84	34	--	24	--	--	9	--
River birch	6,788	1,590	1,904	1,381	815	627	264	122	64	--	21	--	--
Sweetgum	26,875	16,502	3,085	2,194	1,783	1,117	864	615	310	200	116	91	--
Tupelo	50,231	36,965	7,490	2,415	1,372	870	359	406	231	76	13	34	--
Black cherry	118,849	84,557	17,829	6,439	3,703	2,896	1,330	950	554	281	198	112	--
Black walnut	25,753	8,109	3,524	3,524	2,961	2,106	2,332	1,346	989	586	143	131	--
Butternut	253	--	--	93	29	40	26	65	--	--	--	--	--
Yellow-poplar	81,035	39,570	11,641	5,834	5,408	4,489	3,525	3,075	2,657	1,939	1,234	1,604	58
Other hardwoods	380,159	294,115	54,588	15,374	7,677	3,935	1,917	1,319	552	469	140	73	--
Total hardwoods	1,881,992	1,171,879	302,873	114,948	84,907	62,221	44,457	34,597	24,511	17,036	10,173	13,113	1,279
All species	1,995,453	1,233,064	321,910	125,464	94,858	68,449	48,073	36,266	25,276	17,401	10,300	13,113	1,279

All table cells without observations in the inventory sample are indicated by --. Cells with observations smaller than the precision reported in the table are shown as zero. Columns and rows may not add to their totals due to rounding.

Table 12. -- Net volume of growing stock on timberland by species group and diameter class, Indiana, 1998

(In thousand cubic feet)

Species group	All classes	Diameter class (inches at breast height)									
		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
Softwoods											
Jack pine	5,050	148	953	1,771	718	1,461	--	--	--	--	--
Red pine	12,037	687	3,579	4,654	2,115	1,001	--	--	--	--	--
White pine	72,958	2,065	7,918	14,864	16,774	12,523	8,941	7,267	2,607	--	--
Shortleaf pine	39,112	1,593	5,675	8,356	11,256	6,995	3,827	449	960	--	--
Virginia pine	90,051	6,596	15,216	16,487	17,684	13,155	10,731	7,518	2,664	--	--
Baldcypress	3,538	50	79	94	378	620	615	734	968	--	--
Eastern redcedar	49,543	12,575	13,744	10,125	6,452	3,554	2,037	648	407	--	--
Other softwoods	5,493	769	2,644	1,544	537	--	--	--	--	--	--
Total softwoods	277,782	24,482	49,808	57,896	55,915	39,309	26,151	16,615	7,606	--	--
Hardwoods											
Select white oak	783,239	13,815	22,653	43,176	62,206	84,513	105,530	114,116	96,284	206,731	34,217
Other white oak	141,495	983	3,144	7,064	12,727	21,595	25,694	30,495	20,648	19,146	--
Select red oak	391,761	5,712	8,447	22,145	30,501	36,146	41,157	49,305	45,339	100,445	52,564
Other red oak	620,742	9,628	20,543	38,746	50,535	74,856	73,199	90,781	72,314	166,523	23,618
Select hickory	290,579	13,526	26,404	35,691	53,963	46,939	45,922	41,431	10,581	16,121	--
Other hickory	418,623	11,675	30,883	48,463	66,227	77,073	67,526	48,094	22,640	43,062	2,979
Basswood	70,156	4,309	5,203	7,400	7,583	6,566	14,430	4,359	6,116	13,617	572
Beech	161,528	4,980	9,090	11,228	9,122	17,196	19,041	24,422	18,655	41,988	5,806
Hard maple	665,556	48,847	69,699	80,443	86,250	96,260	82,456	62,995	54,062	74,404	10,139
Soft maple	346,423	22,234	35,468	41,168	35,523	38,292	37,399	29,161	31,841	66,066	9,271
Elm	163,020	23,915	30,950	26,834	23,056	16,676	11,981	6,316	3,734	19,558	--
Black ash	7,653	296	1,824	1,502	1,789	668	1,226	--	--	347	--
White & green ash	486,797	21,468	40,087	54,059	63,885	74,491	59,984	59,781	52,962	51,643	8,436
Sycamore	313,785	5,747	10,079	21,173	22,591	30,880	26,674	27,949	38,443	102,612	27,637
Cottonwood	178,932	636	2,873	5,376	7,310	7,746	18,700	6,527	5,785	71,703	52,275
Willow	14,099	744	1,615	1,522	855	2,231	2,927	1,651	2,555	--	--
Hackberry	79,780	5,197	10,363	10,155	8,993	9,218	10,785	8,423	4,976	11,671	--
Bigtooth aspen	35,779	996	2,102	3,426	4,918	6,251	7,936	5,821	3,040	1,288	--
Quaking aspen	4,116	603	485	927	568	--	758	--	--	775	--
River birch	22,311	2,928	4,221	5,521	3,810	2,668	2,053	--	1,110	--	--
Sweetgum	84,591	4,773	8,964	10,305	12,658	13,789	10,080	9,007	6,946	8,069	--
Tupelo	49,103	4,984	6,812	7,995	5,027	9,105	7,691	3,576	776	3,137	--
Black cherry	151,921	14,117	17,534	26,033	19,235	21,669	18,993	12,143	12,026	10,172	--
Black walnut	174,129	8,135	14,206	18,731	33,619	28,594	29,484	24,136	7,435	9,789	--
Butternut	2,390	151	96	361	328	1,454	--	--	--	--	--
Yellow-poplar	747,060	15,592	33,135	51,831	65,262	85,284	107,557	104,903	90,674	179,501	13,321
Other hardwoods	216,946	32,344	37,664	35,634	28,691	28,935	18,257	20,208	8,763	6,450	--
Total hardwoods	6,622,513	278,337	454,543	616,908	717,231	839,094	847,440	785,601	617,704	1,224,820	240,835
All species	6,900,295	302,818	504,351	674,805	773,145	878,404	873,591	802,216	625,309	1,224,820	240,835

All table cells without observations in the inventory sample are indicated by --. Cells with observations smaller than the precision reported in the table are shown as zero. Columns and rows may not add to their totals due to rounding.

Table 13. -- Net volume of growing stock in the saw-log portion of sawtimber trees on timberland by species group and diameter class, Indiana, 1998

(In thousand cubic feet)

Species group	All classes	Diameter class (inches at breast height)							
		9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
Softwoods									
Jack pine	3,369	1,390	627	1,353	--	--	--	--	--
Red pine	6,488	3,719	1,850	919	--	--	--	--	--
White pine	56,788	12,365	14,848	11,596	8,466	6,986	2,527	--	--
Shortleaf pine	28,350	6,841	10,029	6,475	3,644	430	931	--	--
Virginia pine	61,438	13,426	15,761	12,233	10,191	7,235	2,591	--	--
Baldcypress	3,183	65	323	563	587	706	939	--	--
Eastern redcedar	20,176	8,219	5,743	3,273	1,928	620	393	--	--
Other softwoods	1,626	1,173	453	--	--	--	--	--	--
Total softwoods	181,420	47,199	49,634	36,410	24,816	15,978	7,382	--	--
Hardwoods									
Select white oak	631,065	--	45,973	69,652	92,396	103,491	89,326	196,869	33,357
Other white oak	113,443	--	9,128	17,546	22,276	27,408	19,042	18,042	--
Select red oak	326,429	--	23,650	30,520	36,577	45,210	42,412	96,494	51,566
Other red oak	496,638	--	37,987	62,172	64,298	82,721	67,325	159,037	23,099
Select hickory	180,042	--	39,038	38,341	40,034	37,491	9,818	15,320	--
Other hickory	280,571	--	48,764	63,705	59,423	43,850	21,062	40,879	2,888
Basswood	47,794	--	5,832	5,543	12,910	4,031	5,772	13,147	560
Beech	124,745	--	7,022	14,552	17,049	22,508	17,568	40,335	5,709
Hard maple	407,537	--	65,027	80,448	72,904	57,559	50,553	71,145	9,902
Soft maple	218,661	--	26,089	31,488	32,725	26,500	29,598	63,223	9,038
Elm	67,962	--	16,281	13,495	10,419	5,713	3,468	18,586	--
Black ash	3,227	--	1,262	560	1,073	--	--	332	--
White & green ash	322,857	--	47,373	61,817	52,741	54,292	49,251	49,200	8,184
Sycamore	255,399	--	17,559	26,267	23,789	25,759	36,106	98,818	27,100
Cottonwood	161,011	--	5,590	6,646	16,823	6,025	5,431	69,134	51,361
Willow	8,707	--	589	1,807	2,494	1,478	2,338	--	--
Hackberry	46,404	--	6,336	7,440	9,300	7,593	4,602	11,133	--
Bigtooth aspen	25,189	--	3,706	5,202	6,993	5,273	2,801	1,214	--
Quaking aspen	1,822	--	426	--	658	--	--	738	--
River birch	7,499	--	2,609	2,109	1,763	--	1,017	--	--
Sweetgum	50,561	--	8,728	10,993	8,672	8,095	6,417	7,656	--
Tupelo	24,219	--	3,392	7,257	6,641	3,229	716	2,984	--
Black cherry	78,647	--	13,185	17,347	16,466	10,862	11,125	9,663	--
Black walnut	109,663	--	23,748	22,901	25,303	21,653	6,826	9,232	--
Butternut	1,366	--	209	1,157	--	--	--	--	--
Yellow-poplar	588,071	--	50,645	72,532	96,539	96,869	85,559	172,849	13,078
Other hardwoods	90,964	--	19,967	22,934	15,745	18,070	8,129	6,118	--
Total hardwoods	4,670,493	--	530,115	694,432	746,012	715,678	576,264	1,172,148	235,844
All species	4,851,913	47,199	579,750	730,842	770,828	731,656	583,646	1,172,148	235,844

All table cells without observations in the inventory sample are indicated by --. Cells with observations smaller than the precision reported in the table are shown as zero. Columns and rows may not add to their totals due to rounding.

Table 14. -- Net volume of sawtimber (International 1/4-inch rule) on timberland by species group and diameter class, Indiana, 1998

(In thousand board feet) [1]

Species group	All classes	Diameter class (inches at breast height)							
		9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
Softwoods									
Jack pine	18,765	8,295	3,402	7,068	--	--	--	--	--
Red pine	36,417	21,575	10,055	4,787	--	--	--	--	--
White pine	296,188	67,252	78,129	59,260	43,269	35,387	12,891	--	--
Shortleaf pine	160,903	40,685	56,564	36,004	20,059	2,387	5,204	--	--
Virginia pine	346,543	80,406	88,696	67,496	55,962	39,680	14,303	--	--
Baldcypress	15,649	369	1,593	2,713	2,854	3,457	4,662	--	--
Eastern redcedar	120,276	55,983	33,023	17,319	9,344	2,877	1,730	--	--
Other softwoods	9,895	7,284	2,611	--	--	--	--	--	--
Total softwoods	1,004,636	281,850	274,074	194,647	131,488	83,788	38,789	--	--
Hardwoods									
Select white oak	3,229,557	--	307,067	410,444	502,993	534,176	441,032	902,457	131,388
Other white oak	651,284	--	64,611	109,518	129,045	151,906	102,598	93,606	--
Select red oak	1,699,636	--	150,435	179,713	204,964	244,895	223,559	476,959	219,111
Other red oak	2,648,745	--	248,829	369,487	360,794	444,071	350,203	777,714	97,648
Select hickory	1,038,553	--	259,800	226,584	222,123	200,535	51,314	78,196	--
Other hickory	1,636,003	--	330,375	385,276	337,825	240,780	113,128	213,970	14,649
Basswood	262,037	--	38,367	33,064	72,062	21,551	29,874	64,526	2,592
Beech	665,713	--	46,167	86,607	95,153	120,948	91,320	200,650	24,867
Hard maple	2,217,682	--	415,316	464,804	398,176	302,029	256,452	340,363	40,541
Soft maple	1,072,160	--	154,198	167,758	164,307	127,971	139,163	281,590	37,173
Elm	370,564	--	110,182	78,364	55,066	28,554	16,564	81,834	--
Black ash	18,559	--	8,054	3,105	5,771	--	--	1,628	--
White & green ash	1,736,046	--	289,580	345,612	282,681	284,220	252,807	243,818	37,328
Sycamore	1,318,720	--	104,700	145,854	127,404	134,631	186,994	493,043	126,093
Cottonwood	847,993	--	33,927	38,056	94,841	33,109	29,970	369,273	248,819
Willow	46,178	--	3,861	10,360	13,342	7,377	11,237	--	--
Hackberry	243,972	--	42,674	43,063	49,265	37,973	22,053	48,944	--
Bigtooth aspen	145,053	--	23,196	31,053	40,485	29,439	14,957	5,923	--
Quaking aspen	9,653	--	2,679	--	3,799	--	--	3,175	--
River birch	44,000	--	17,463	12,207	9,369	--	4,961	--	--
Sweetgum	272,332	--	57,852	62,872	45,750	40,480	30,736	34,643	--
Tupelo	132,410	--	23,040	41,741	34,830	15,976	3,439	13,383	--
Black cherry	424,466	--	88,066	98,979	85,929	54,660	53,265	43,567	--
Black walnut	639,339	--	163,403	139,542	142,228	115,304	34,897	43,965	--
Butternut	8,139	--	1,492	6,647	--	--	--	--	--
Yellow-poplar	3,359,811	--	326,000	436,872	562,042	551,763	480,188	938,318	64,626
Other hardwoods	504,060	--	131,320	132,355	82,841	91,167	38,681	27,697	--
Total hardwoods	25,242,665	--	3,442,655	4,059,939	4,123,087	3,813,515	2,979,390	5,779,244	1,044,835
All species	26,247,301	281,850	3,716,729	4,254,586	4,254,575	3,897,304	3,018,179	5,779,244	1,044,835

All table cells without observations in the inventory sample are indicated by --. Cells with observations smaller than the precision reported in the table are shown as zero. Columns and rows may not add to their totals due to rounding.

[1] International 1/4-inch rule.

Table 14A. -- Net volume of sawtimber (Doyle rule) on timberland by species group and diameter class, Indiana, 1998

(In thousand board feet) [1]

Species group	All classes	Diameter class (inches at breast height)							
		9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
Softwoods									
Jack pine	8,727	2,866	1,626	4,235	--	--	--	--	--
Red pine	15,129	7,454	4,806	2,868	--	--	--	--	--
White pine	164,227	23,236	37,346	35,509	29,890	27,195	11,051	--	--
Shortleaf pine	82,820	14,057	27,038	21,573	13,857	1,834	4,461	--	--
Virginia pine	192,035	27,780	42,397	40,444	38,659	30,494	12,262	--	--
Baldcypress	11,140	128	761	1,626	1,972	2,657	3,997	--	--
Eastern redcedar	55,654	19,342	15,785	10,377	6,455	2,211	1,483	--	--
Other softwoods	3,764	2,517	1,248	--	--	--	--	--	--
Total softwoods	533,496	97,379	131,007	116,632	90,832	64,391	33,254	--	--
Hardwoods									
Select white oak	2,205,344	--	128,108	210,065	295,860	350,900	316,661	754,636	149,113
Other white oak	407,511	--	26,956	56,051	75,904	99,787	73,665	75,147	--
Select red oak	1,247,784	--	62,761	91,977	120,560	160,871	160,515	402,429	248,669
Other red oak	1,806,918	--	103,812	189,104	212,219	291,710	251,446	647,808	110,820
Select hickory	587,868	--	108,389	115,966	130,653	131,732	36,844	64,286	--
Other hickory	962,894	--	137,833	197,184	198,709	158,168	81,226	173,149	16,625
Basswood	169,829	--	16,007	16,922	42,387	14,157	21,450	55,964	2,942
Beech	458,728	--	19,261	44,326	55,969	79,451	65,568	165,933	28,221
Hard maple	1,360,253	--	173,270	237,887	234,207	198,403	184,132	286,344	46,010
Soft maple	713,840	--	64,331	85,859	96,645	84,064	99,919	240,834	42,188
Elm	217,579	--	45,968	40,107	32,390	18,757	11,893	68,465	--
Black ash	9,767	--	3,360	1,589	3,395	--	--	1,422	--
White & green ash	1,077,604	--	120,813	176,884	166,273	186,704	181,515	203,050	42,364
Sycamore	979,562	--	43,681	74,648	74,939	88,439	134,262	420,490	143,103
Cottonwood	730,346	--	14,154	19,477	55,785	21,749	21,518	315,277	282,385
Willow	27,675	--	1,611	5,302	7,848	4,846	8,068	--	--
Hackberry	149,874	--	17,804	22,040	28,978	24,944	15,834	40,274	--
Bigtooth aspen	84,099	--	9,677	15,893	23,813	19,339	10,739	4,637	--
Quaking aspen	5,995	--	1,118	--	2,235	--	--	2,642	--
River birch	22,606	--	7,285	6,248	5,511	--	3,562	--	--
Sweetgum	160,402	--	24,136	32,178	26,910	26,591	22,068	28,519	--
Tupelo	75,377	--	9,612	21,363	20,487	10,495	2,469	10,951	--
Black cherry	248,143	--	36,741	50,658	50,543	35,906	38,244	36,050	--
Black walnut	359,999	--	68,172	71,417	83,659	75,743	25,056	35,952	--
Butternut	4,025	--	623	3,402	--	--	--	--	--
Yellow-poplar	2,253,474	--	136,007	223,591	330,593	362,453	344,775	782,709	73,344
Other hardwoods	281,824	--	54,787	67,739	48,727	59,888	27,773	22,911	--
Total hardwoods	16,609,316	--	1,436,276	2,077,877	2,425,200	2,505,098	2,139,202	4,839,880	1,185,784
All species	17,142,812	97,379	1,567,283	2,;94,509	2,516,031	2,569,490	2,172,456	4,839,880	1,185,784

All table cells without observations in the inventory sample are indicated by --. Cells with observations smaller than the precision reported in the table are shown as zero. Columns and rows may not add to their totals due to rounding.

[1] Doyle rule.

Table 15. -- Net volume of sawtimber (International 1/4-inch rule) on timberland by species group, grade, and Forest Survey Unit, Indiana, 1998

(In thousand board feet) [1]

Species group	Lower Wabash Unit					Knobs Unit					Upland Flats Unit					Northern Unit				
		Log grade					Log grade					Log grade					Log grade			
	Total [2]	1	2	3	4	Total [2]	1	2	3	4	Total [2]	1	2	3	4	Total [2]	1	2	3	4
Softwoods																				
Jack pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7,094	--	--	7,094	--
Red pine	9,436	--	--	9,436	--	21,842	--	--	21,842	--	--	--	--	--	--	25,037	--	--	25,037	--
White pine	68,629	--	--	53,764	14,865	158,114	--	46,469	100,754	10,890	--	--	--	--	--	154,895	--	54,577	100,318	--
Shortleaf pine	15,102	--	--	15,102	--	157,580	1,095	38,141	118,344	--	--	--	--	--	--	--	--	--	--	--
Virginia pine	14,440	--	--	14,440	--	398,022	6,765	3,769	387,488	--	8,621	--	--	8,621	--	11,088	--	--	11,088	--
Baldcypress	25,808	--	--	25,808	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Eastern redcedar	1,112	--	--	1,112	--	63,245	--	--	63,245	--	52,475	--	--	52,475	--	--	--	--	--	--
Other softwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	16,318	--	--	16,318	--
Total softwoods	134,527	--	--	119,662	14,865	798,802	7,860	88,379	691,672	10,890	61,095	--	--	61,095	--	214,431	--	54,577	159,854	--

Species group	Lower Wabash Unit					Knobs Unit					Upland Flats Unit					Northern Unit				
		Log grade					Log grade					Log grade					Log grade			
	Total [2]	1	2	3	Tie/timber	Total [2]	1	2	3	Tie/timber	Total [2]	1	2	3	Tie/timber	Total [2]	1	2	3	Tie/timber
Hardwoods																				
Select white oak	496,279	117,073	179,201	116,988	83,017	1,633,642	678,856	457,062	388,212	109,512	282,540	123,824	111,163	39,573	7,980	730,499	108,986	336,374	178,297	106,843
Other white oak	9,275	--	5,208	--	4,066	613,760	287,321	146,562	171,982	7,895	--	--	--	--	--	--	--	--	--	--
Select red oak	354,614	18,088	71,684	136,027	128,815	606,540	209,539	134,401	162,620	99,980	162,365	16,173	15,133	25,107	105,953	495,861	67,825	145,696	128,214	154,126
Other red oak	494,669	91,228	86,566	170,335	146,540	1,312,471	292,523	274,362	444,814	300,772	144,334	11,112	35,836	57,799	39,588	552,439	40,094	101,295	120,989	290,061
Select hickory	205,931	22,860	27,819	86,538	68,713	349,501	32,767	115,196	141,291	60,245	50,325	--	3,289	36,090	10,946	386,605	--	63,601	174,680	148,324
Other hickory	446,721	29,983	142,318	171,534	102,886	683,662	143,026	221,088	235,175	84,373	227,969	47,469	56,290	94,363	29,846	283,270	19,012	137,495	102,760	24,003
Basswood	37,153	17,792	--	11,049	8,312	25,157	19,971	3,182	2,005	--	5,203	5,203	--	--	--	151,748	43,904	62,247	41,609	3,988
Beech	136,249	--	12,032	14,006	110,211	305,653	--	4,088	53,577	247,989	104,444	--	17,518	--	86,927	29,522	--	--	19,654	9,868
Hard maple	495,690	110,260	129,980	166,005	89,445	976,407	96,167	292,181	385,005	203,054	289,477	25,312	108,678	99,407	56,079	599,050	104,221	133,301	268,779	92,750
Soft maple	301,784	57,356	41,169	168,892	34,367	311,213	57,642	69,441	114,754	69,376	72,729	--	9,492	37,856	25,381	266,790	9,553	41,016	92,126	124,096
Elm	136,921	47,970	22,340	43,977	22,633	53,854	5,305	19,806	26,976	1,767	23,765	--	--	7,694	16,071	181,003	22,317	58,700	83,417	16,569
Black ash	--	--	--	--	--	--	--	--	--	--	3,430	--	--	3,430	--	3,816	--	1,740	--	2,076
White & green ash	348,739	149,436	96,958	96,446	5,900	389,668	150,397	106,353	127,933	4,985	254,342	42,757	72,415	134,511	4,659	790,543	301,649	244,524	230,100	14,270
Sycamore	291,356	76,856	99,067	86,222	29,211	456,320	168,944	128,212	128,186	30,978	131,609	44,312	49,529	6,481	31,286	354,190	297,038	28,790	25,586	2,776
Cottonwood	354,810	218,090	47,765	59,821	29,134	153,367	97,588	37,105	18,674	--	58,648	43,645	15,003	--	--	466,223	192,144	162,238	71,083	40,758
Willow	26,740	--	--	4,396	22,344	--	--	--	--	--	--	--	--	--	--	35,281	--	4,261	6,284	24,736
Hackberry	62,670	13,693	19,699	24,321	4,958	50,453	34,163	2,767	4,393	9,130	8,777	--	2,681	6,097	--	138,926	6,103	48,462	77,512	6,849
Bigtooth aspen	15,036	--	--	4,551	10,484	79,520	--	8,335	38,479	32,706	43,397	--	16,275	21,840	5,283	19,796	6,233	--	--	13,562
Quaking aspen	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	10,684	--	--	7,931	2,752
River birch	23,230	4,968	7,727	--	10,534	19,817	--	4,421	3,229	12,167	--	--	--	--	--	--	--	--	--	--
Sweetgum	69,217	7,322	11,766	43,015	7,113	112,676	33,284	45,031	32,273	2,088	65,821	19,544	14,039	30,077	2,160	25,164	14,248	--	10,916	--
Tupelo	44,191	7,171	13,552	10,169	13,300	74,895	14,782	20,251	27,429	12,433	14,907	9,967	2,739	2,202	--	10,088	--	--	3,304	6,784
Black cherry	44,251	13,664	8,654	17,808	4,125	101,099	32,076	30,513	24,061	14,449	45,484	14,191	8,095	23,198	--	183,004	6,201	58,134	73,977	44,692
Black walnut	265,040	43,536	123,211	79,718	18,575	154,308	21,990	54,419	71,606	6,293	78,659	6,915	31,617	36,717	3,410	184,620	34,785	68,284	75,114	6,437
Butternut	3,951	--	--	3,951	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Yellow-poplar	979,427	377,476	191,033	191,123	219,795	1,571,428	436,115	329,322	426,342	379,650	368,587	134,532	85,873	54,538	93,644	451,135	180,173	113,170	65,584	92,208
Other hardwoods	180,112	10,043	66,649	69,964	33,457	120,616	5,245	45,145	67,921	2,307	58,867	4,328	17,027	20,325	17,187	212,429	--	48,118	87,937	76,375
Total hardwoods	5,824,054	1,434,864	1,404,399	1,776,855	1,207,936	10,156,029	2,817,702	2,549,242	3,096,936	1,692,149	2,495,680	549,284	672,689	737,306	536,401	6,562,684	1,454,485	1,857,446	1,945,852	1,304,901
All species	5,958,581	1,434,864	1,404,399	1,896,517	1,222,801	10,954,831	2,825,563	2,637,621	3,788,608	1,703,040	2,556,776	549,284	672,689	798,401	536,401	6,777,115	1,454,485	1,912,023	2,105,706	1,304,901

All table cells without observations in the inventory sample are indicated by --. Cells with observations smaller than the precision reported in the table are shown as zero. Columns and rows may not add to their totals due to rounding.

[1] International 1/4-inch rule.

[2] Totals in table 15 might not equal totals in other tables due to rounding.

Table 15A. -- Net volume of sawtimber (Doyle rule) on timberland by species group, grade, and Forest Survey Unit, Indiana, 1998

(In thousand board feet) [1]

Species group	Lower Wabash Unit					Knobs Unit					Upland Flats Unit					Northern Unit				
		Log grade					Log grade					Log grade					Log grade			
	Total [2]	1	2	3	4	Total [2]	1	2	3	4	Total [2]	1	2	3	4	Total [2]	1	2	3	4
Softwoods																				
Jack pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2,854	--	--	2,854	--
Red pine	4,344	--	--	4,344	--	7,902	--	--	7,902	--	--	--	--	--	--	11,344	--	--	11,344	--
White pine	41,878	--	--	30,929	10,949	84,474	--	26,737	53,100	4,637	--	--	--	--	--	85,373	--	37,724	47,649	--
Shortleaf pine	6,995	--	--	6,995	--	80,678	528	21,610	58,540	--	--	--	--	--	--	--	--	--	--	--
Virginia pine	6,187	--	--	6,187	--	227,165	3,459	1,681	222,025	--	3,238	--	--	3,238	--	4,582	--	--	4,582	--
Baldcypress	18,522	--	--	18,522	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Eastern redcedar	387	--	--	387	--	31,047	--	--	31,047	--	23,271	--	--	23,271	--	--	--	--	--	--
Other softwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6,259	--	--	6,259	--
Total softwoods	78,314	--	--	67,365	10,949	431,265	3,987	50,028	372,614	4,637	26,509	--	--	26,509	--	110,411	--	37,724	72,687	--

Species group	Lower Wabash Unit					Knobs Unit					Upland Flats Unit					Northern Unit				
		Log grade					Log grade					Log grade					Log grade			
	Total [2]	1	2	3	Tie/timber	Total [2]	1	2	3	Tie/timber	Total [2]	1	2	3	Tie/timber	Total [2]	1	2	3	Tie/timber
Hardwoods																				
Select white oak	340,614	89,662	117,924	70,890	62,138	1,070,135	506,063	279,123	229,302	55,646	204,382	94,755	77,641	28,315	3,671	545,989	82,798	254,121	122,956	86,115
Other white oak	5,160	--	3,449	--	1,710	378,524	202,437	84,915	87,554	3,618	--	--	--	--	--	--	--	--	--	--
Select red oak	265,408	15,931	46,741	113,140	89,595	435,309	180,002	98,978	105,120	51,209	103,439	11,248	7,566	16,870	67,756	393,287	54,503	118,989	126,731	93,064
Other red oak	348,142	86,661	56,414	111,428	93,640	894,478	235,734	182,717	294,186	181,841	92,867	6,937	28,443	34,150	23,336	382,276	27,033	75,426	93,071	186,746
Select hickory	115,669	18,132	15,079	46,222	36,237	188,695	21,222	65,099	72,831	29,544	26,512	--	1,697	19,392	5,423	225,828	--	40,888	108,405	76,535
Other hickory	267,660	21,205	91,860	101,872	52,723	392,769	93,933	131,114	124,369	43,353	128,484	29,249	30,166	53,738	15,331	165,486	11,275	86,077	57,228	10,906
Basswood	20,707	10,551	--	5,638	4,518	18,663	16,178	1,642	843	--	3,085	3,085	--	--	--	99,148	29,570	42,295	25,225	2,058
Beech	88,390	--	9,497	8,461	70,432	189,465	--	2,959	34,125	152,382	74,309	--	15,429	--	58,880	19,881	--	--	14,203	5,678
Hard maple	313,248	88,680	85,795	91,021	47,752	568,131	65,343	170,982	222,575	109,231	174,977	16,372	74,476	52,002	32,127	422,003	83,746	82,617	196,724	58,917
Soft maple	202,019	42,784	28,204	113,913	17,117	197,419	40,559	42,002	70,920	43,938	56,741	--	5,629	38,807	12,306	172,047	6,915	26,049	66,518	72,566
Elm	82,864	38,906	12,176	21,316	10,465	27,670	3,146	11,700	12,081	743	10,686	--	--	3,236	7,450	112,182	17,414	37,858	49,432	7,478
Black ash	--	--	--	--	--	--	--	--	--	--	1,443	--	--	1,443	--	1,771	--	898	--	873
White & green ash	230,467	114,485	62,500	50,675	2,807	245,537	114,233	56,469	72,738	2,097	146,816	29,900	42,909	71,772	2,234	494,758	210,648	149,745	128,045	6,320
Sycamore	207,798	63,929	72,702	55,684	15,483	343,972	130,075	99,621	94,537	19,740	89,439	30,722	29,525	2,726	26,466	306,349	267,813	18,077	19,290	1,168
Cottonwood	297,682	206,922	31,342	42,979	16,439	143,710	91,861	37,229	14,620	--	58,187	49,938	8,248	--	--	377,885	154,720	144,393	49,630	29,142
Willow	15,771	--	--	2,268	13,503	--	--	--	--	--	--	--	--	--	--	21,379	--	2,199	3,727	15,454
Hackberry	43,144	9,893	14,150	16,787	2,315	32,806	23,506	1,428	1,848	6,025	4,347	--	1,383	2,964	--	81,314	3,619	31,681	41,953	4,061
Bigtooth aspen	8,635	--	--	2,699	5,936	48,554	--	4,307	24,807	19,440	27,416	--	11,357	13,837	2,222	10,011	3,696	--	--	6,315
Quaking aspen	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5,574	--	--	4,416	1,158
River birch	12,991	2,946	4,339	--	5,706	11,353	--	2,281	1,473	7,599	--	--	--	--	--	--	--	--	--	--
Sweetgum	37,814	4,849	6,840	23,133	2,992	64,400	22,482	25,183	15,857	878	41,343	12,593	7,689	20,152	909	16,916	11,957	--	4,959	--
Tupelo	28,275	4,749	7,325	5,532	10,669	40,763	9,314	12,475	12,859	6,115	8,250	5,910	1,413	926	--	5,413	--	--	1,390	4,023
Black cherry	23,549	9,049	4,922	7,843	1,735	60,585	23,439	17,709	12,586	6,852	26,247	8,415	5,361	12,471	--	95,299	4,107	32,098	34,880	24,215
Black walnut	146,970	27,797	71,242	38,813	9,118	83,679	13,591	28,752	37,852	3,484	43,006	4,101	18,379	18,767	1,760	103,388	22,456	42,725	34,848	3,359
Butternut	2,038	--	--	2,038	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Yellow-poplar	655,001	283,524	125,717	111,000	134,760	1,026,158	335,253	211,238	251,747	227,919	245,607	103,692	55,346	31,103	55,467	330,364	151,642	79,703	33,739	65,279
Other hardwoods	96,937	6,285	36,832	34,387	19,433	62,429	3,110	23,696	34,653	970	31,356	2,566	9,130	9,369	10,290	126,671	--	29,219	50,611	46,841
Total hardwoods	3,856,954	1,146,940	905,048	1,077,742	727,224	6,525,204	2,131,481	1,591,620	1,829,480	972,624	1,598,939	409,486	431,787	432,040	325,627	4,515,217	1,143,912	1,295,058	1,267,978	808,269
All species	3,935,268	1,146,940	905,048	1,145,106	738,173	6,956,470	2,135,468	1,641,648	2,202,093	977,261	1,625,448	409,486	431,787	458,549	325,627	4,625,628	1,143,912	1,332,782	1,340,665	808,269

All table cells without observations in the inventory sample are indicated by --. Cells with observations smaller than the precision reported in the table are shown as zero. Columns and rows may not add to their totals due to rounding.

[1] Doyle rule.

[2] Totals in table 15 might not equal totals in other tables due to rounding.

Table 16. -- Net volume of growing stock and sawtimber (International 1/4-inch rule) on timberland by Forest Survey Unit, county/county group, and major species group, Indiana, 1998

Forest Survey Unit and county/county group	Growing stock					Sawtimber				
		Major species group					Major species group			
	All species	Pine	Other softwoods	Soft hardwoods	Hard hardwoods	All species	Pine	Other softwoods	Soft hardwoods	Hard hardwoods
	(In thousand cubic feet)					(In thousand board feet)[1]				
Lower Wabash Unit										
Clay	74,070	3,555	--	40,249	30,265	275,988	12,820	--	145,057	118,110
Daviess, Knox	109,639	--	--	74,805	34,834	455,771	--	--	318,475	137,296
Gibson	57,944	--	--	24,869	33,075	211,894	--	--	87,191	124,703
Greene	173,381	5,120	--	64,344	103,917	626,738	17,500	--	217,473	391,765
Martin	231,630	1,308	105	72,941	157,275	943,096	3,845	--	301,752	637,500
Parke	158,336	--	--	71,727	86,609	632,392	--	--	298,202	334,190
Pike	101,447	26,760	74	49,885	24,728	317,451	102,561	--	132,605	82,285
Posey, Vanderburgh	91,780	1,079	3,675	41,497	45,529	355,997	4,616	15,649	155,284	180,448
Putnam	156,420	--	148	51,436	104,836	620,900	--	674	212,554	407,672
Sullivan	102,612	619	--	42,367	59,626	393,237	--	--	160,849	232,388
Vermillion	65,737	--	--	22,741	42,996	247,954	--	--	91,797	156,157
Vigo	84,808	--	--	37,159	47,648	312,261	--	--	123,514	188,747
Total	1,407,803	38,441	4,003	594,021	771,338	5,393,679	141,342	16,323	2,244,753	2,991,261
Knobs Unit										
Brown	263,969	5,108	265	40,948	217,648	1,062,224	25,143	--	149,942	887,139
Clark, Scott	221,306	34,825	1,130	57,571	127,779	868,910	139,531	3,588	216,336	509,456
Crawford	179,532	--	3,717	35,257	140,558	656,810	--	6,505	130,887	519,417
Dubois	150,908	5,662	257	52,040	92,950	604,501	24,145	932	209,640	369,785
Floyd,Harrison	252,911	20,600	9,000	66,999	156,311	962,914	90,729	25,602	237,165	609,418
Jackson	188,686	4,062	91	67,079	117,453	730,174	13,887	--	247,042	469,244
Lawrence	207,671	3,940	220	59,837	143,675	820,652	15,138	--	218,471	587,043
Monroe	228,815	9,357	2,720	77,273	139,465	879,789	37,391	4,097	297,955	540,347
Morgan	186,701	7,715	--	85,439	93,547	778,877	26,967	--	351,013	400,896
Orange	228,133	11,764	4,201	70,803	141,364	868,896	35,061	10,066	265,783	557,987
Owen	202,101	1,895	423	98,172	101,611	793,703	4,534	662	396,970	391,537
Perry	262,766	20,999	3,743	48,532	189,492	1,010,010	77,573	10,131	176,698	745,608
Spencer	78,606	--	--	24,007	54,599	286,851	--	--	68,551	218,300
Warrick	73,789	3,523	159	24,538	45,569	249,809	14,370	--	84,315	151,124
Washington	250,262	17,027	5,476	74,576	153,183	1,018,204	72,630	15,421	306,066	624,087
Total	2,976,154	146,478	31,401	883,072	1,915,204	11,592,323	577,097	77,002	3,356,834	7,581,389
Upland Flats Unit										
Dearborn	96,978	86	3,231	16,658	77,002	333,444	--	6,158	49,010	278,275
Fayette, Union	47,192	--	137	14,575	32,481	190,244	--	--	57,879	132,365
Franklin	158,936	--	109	62,282	96,545	594,571	--	615	222,513	371,443
Jefferson	117,379	1,480	5,432	50,701	59,766	415,538	4,159	12,860	190,568	207,951
Jennings	127,971	633	468	64,586	62,285	481,903	1,069	--	228,435	252,400
Ohio, Switzerland	75,656	334	6,991	28,660	39,672	226,267	1,632	16,907	96,067	111,661
Ripley	138,716	--	521	38,255	99,939	513,568	--	1,391	122,506	389,672
Total	762,829	2,533	16,889	275,717	467,689	2,755,535	6,859	37,932	966,977	1,743,766

(Table 16 continued on next page)

(Table 16 continued)

Forest Survey Unit and county/county group	Growing stock					Sawtimber				
		Major species group					Major species group			
	All species	Pine	Other softwoods	Soft hardwoods	Hard hardwoods	All species	Pine	Other softwoods	Soft hardwoods	Hard hardwoods
	(In thousand cubic feet)					(In thousand board feet)[1]				
Northern Unit										
AdHuWe	67,175	--	--	16,410	50,766	226,615	--	--	52,659	173,956
Allen	79,918	2,692	--	22,126	55,100	309,664	9,988	--	78,811	220,865
Bartholomew	87,010	--	--	42,570	44,441	342,380	--	--	162,975	179,405
BeFoWa	127,851	--	--	29,698	98,153	499,322	--	--	115,083	384,239
BlDeGrMa	83,195	719	--	20,549	61,927	289,545	--	--	68,039	221,506
BoClHaTi	49,929	--	--	10,076	39,853	186,141	--	--	36,666	149,475
CaTiWh	98,666	--	875	37,928	59,863	379,699	--	4,668	148,325	226,707
CaHoMiWa	140,522	23,422	--	39,852	77,249	515,371	95,179	--	137,147	283,044
DeHeRuWa	169,417	2,944	--	77,020	89,454	694,383	12,902	--	331,183	350,298
De Kalb, Steuben	81,519	--	--	25,412	56,107	274,819	--	--	66,003	208,816
ElNoWh	122,907	3,671	--	62,133	57,103	466,215	12,456	--	218,882	234,878
Fulton, Marshall	61,291	--	--	27,581	33,711	240,977	--	--	97,112	143,864
HaHeJoMaSh	98,709	--	--	40,191	58,518	366,585	--	--	151,637	214,949
JaLaNe	53,893	1,436	--	23,180	29,277	167,153	4,301	--	64,279	98,573
Jay, Randolph	71,770	--	--	13,215	58,555	247,967	--	--	26,567	221,400
Kosciusko	73,222	--	--	37,340	35,882	276,280	--	--	137,060	139,219
La Grange	55,875	677	413	27,701	27,084	187,077	3,400	--	88,576	95,101
La Porte	80,055	--	--	39,638	40,418	305,787	--	--	144,302	161,484
Montgomery	40,134	--	--	13,901	26,233	135,574	--	--	43,987	91,588
Porter	29,985	24	--	12,583	17,377	112,892	--	--	46,668	66,225
PuStSt	80,463	1,164	--	23,678	55,622	281,318	5,185	--	68,432	207,700
Total	1,753,509	36,749	1,288	642,781	1,072,692	6,505,765	143,412	4,668	2,284,393	4,073,292
All counties	6,900,295	224,201	53,581	2,395,591	4,226,922	26,247,301	868,711	135,925	8,852,957	16,389,708

All table cells without observations in the inventory sample are indicated by --. Cells with observations smaller than the precision reported in the table are shown as zero. Columns and rows may not add to their totals due to rounding.

[1] International 1/4-inch rule.

AdHuWe = Adams, Huntington and Wells Counties.
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JaLaNe = Jasper, Lake and Newton Counties.
PuStSt = Pulaski, St. Joseph and Starke Counties.

Table 16A. -- Net volume of growing stock and sawtimber (Doyle rule) on timberland by Forest Survey Unit, county/county group, and major species group, Indiana, 1998

Forest Survey Unit and county/county group	Growing stock					Sawtimber				
		Major species group					Major species group			
	All species	Pine	Other softwoods	Soft hardwoods	Hard hardwoods	All species	Pine	Other softwoods	Soft hardwoods	Hard hardwoods
	(In thousand cubic feet)					(In thousand board feet)[1]				
Lower Wabash Unit										
Clay	74,070	3,555	--	40,249	30,265	172,721	6,310	--	88,309	78,101
Daviess, Knox	109,639	--	--	74,805	34,834	355,112	--	--	256,982	98,129
Gibson	57,944	--	--	24,869	33,075	136,139	--	--	60,410	75,729
Greene	173,381	5,120	--	64,344	103,917	392,483	8,398	--	134,950	249,135
Martin	231,630	1,308	105	72,941	157,275	637,950	1,841	--	208,941	427,168
Parke	158,336	--	--	71,727	86,609	422,109	--	--	211,331	210,777
Pike	101,447	26,760	74	49,885	24,728	180,381	57,324	--	70,711	52,345
Posey, Vanderburgh	91,780	1,079	3,675	41,497	45,529	251,131	2,116	11,140	109,141	128,734
Putnam	156,420	--	148	51,436	104,836	411,760	--	233	142,772	268,755
Sullivan	102,612	619	--	42,367	59,626	255,305	--	--	111,407	143,898
Vermillion	65,737	--	--	22,741	42,996	160,235	--	--	58,806	101,429
Vigo	84,808	--	--	37,159	47,648	207,769	--	--	75,201	132,568
Total	1,407,803	38,441	4,003	594,021	771,338	3,583,093	75,989	11,373	1,528,962	1,966,770
Knobs Unit										
Brown	263,969	5,108	265	40,948	217,648	690,386	16,762	--	97,304	576,319
Clark, Scott	221,306	34,825	1,130	57,571	127,779	535,014	78,769	1,240	131,218	323,787
Crawford	179,532	--	3,717	35,257	140,558	383,347	--	2,248	79,399	301,700
Dubois	150,908	5,662	257	52,040	92,950	393,984	14,095	322	142,975	236,591
Floyd,Harrison	252,911	20,600	9,000	66,999	156,311	633,347	54,379	12,914	156,161	409,893
Jackson	188,686	4,062	91	67,079	117,453	462,608	7,164	--	165,908	289,535
Lawrence	207,671	3,940	220	59,837	143,675	520,495	7,598	--	135,550	377,347
Monroe	228,815	9,357	2,720	77,273	139,465	550,701	16,844	1,789	202,355	329,713
Morgan	186,701	7,715	--	85,439	93,547	545,199	12,251	--	258,671	274,277
Orange	228,133	11,764	4,201	70,803	141,364	536,050	17,036	4,778	167,921	346,315
Owen	202,101	1,895	423	98,172	101,611	506,469	1,930	229	252,644	251,666
Perry	262,766	20,999	3,743	48,532	189,492	617,752	36,444	5,953	115,587	459,769
Spencer	78,606	--	--	24,007	54,599	172,393	--	--	42,118	130,275
Warrick	73,789	3,523	159	24,538	45,569	161,116	9,459	--	50,355	101,302
Washington	250,262	17,027	5,476	74,576	153,183	661,052	40,986	7,292	223,607	389,166
Total	2,976,154	146,478	31,401	883,072	1,915,204	7,369,911	313,718	36,763	2,221,773	4,797,657
Upland Flats Unit										
Dearborn	96,978	86	3,231	16,658	77,002	214,989	--	2,826	32,654	179,510
Fayette, Union	47,192	--	137	14,575	32,481	133,733	--	--	49,241	84,492
Franklin	158,936	--	109	62,282	96,545	391,801	--	213	159,256	232,332
Jefferson	117,379	1,480	5,432	50,701	59,766	248,100	1,437	5,771	116,638	124,255
Jennings	127,971	633	468	64,586	62,285	311,148	511	--	149,503	161,135
Ohio, Switzerland	75,656	334	6,991	28,660	39,672	142,545	978	7,266	67,754	66,547
Ripley	138,716	--	521	38,255	99,939	339,072	--	665	82,818	255,588
Total	762,829	2,533	16,889	275,717	467,689	1,781,388	2,926	16,740	657,865	1,103,858

(Table 16A continued on next page)

(Table 16A continued)

Forest Survey Unit and county/county group	Growing stock					Sawtimber				
		Major species group					Major species group			
	All species	Pine	Other softwoods	Soft hardwoods	Hard hardwoods	All species	Pine	Other softwoods	Soft hardwoods	Hard hardwoods
	(In thousand cubic feet)					(In thousand board feet)[1]				
Northern Unit										
AdHuWe	67,175	--	--	16,410	50,766	136,221	--	--	36,849	99,373
Allen	79,918	2,692	--	22,126	55,100	222,600	5,051	--	51,805	165,745
Bartholomew	87,010	--	--	42,570	44,441	239,747	--	--	120,018	119,730
BeFoWa	127,851	--	--	29,698	98,153	350,113	--	--	84,348	265,765
BlDeGrMa	83,195	719	--	20,549	61,927	177,477	--	--	38,309	139,168
BoClHaTi	49,929	--	--	10,076	39,853	116,953	--	--	23,628	93,325
CaTiWh	98,666	--	875	37,928	59,863	274,761	--	1,917	116,448	156,396
CaHoMiWa	140,522	23,422	--	39,852	77,249	337,001	51,403	--	98,618	186,980
DeHeRuWa	169,417	2,944	--	77,020	89,454	454,807	5,523	--	232,599	216,685
De Kalb, Steuben	81,519	--	--	25,412	56,107	181,276	--	--	40,656	140,620
ElNoWh	122,907	3,671	--	62,133	57,103	325,183	4,989	--	152,648	167,547
Fulton, Marshall	61,291	--	--	27,581	33,711	157,621	--	--	60,478	97,142
HaHeJoMaSh	98,709	--	--	40,191	58,518	257,073	--	--	118,219	138,854
JaLaNe	53,893	1,436	--	23,180	29,277	115,078	1,716	--	45,535	67,827
Jay, Randolph	71,770	--	--	13,215	58,555	180,210	--	--	15,378	164,832
Kosciusko	73,222	--	--	37,340	35,882	179,719	--	--	88,003	91,716
La Grange	55,875	677	413	27,701	27,084	117,728	2,613	--	56,156	58,958
La Porte	80,055	--	--	39,638	40,418	221,072	--	--	108,852	112,220
Montgomery	40,134	--	--	13,901	26,233	93,401	--	--	27,015	66,386
Porter	29,985	24	--	12,583	17,377	86,793	--	--	38,922	47,871
PuStSt	80,463	1,164	--	23,678	55,622	183,585	2,775	--	41,637	139,173
Total	1,753,509	36,749	1,288	642,781	1,072,692	4,408,419	74,070	1,917	1,596,119	2,736,313
All counties	6,900,295	224,201	53,581	2,395,591	4,226,922	17,142,812	466,702	66,794	6,004,718	10,604,598

All table cells without observations in the inventory sample are indicated by --. Cells with observations smaller than the precision reported in the table are shown as zero. Columns and rows may not add to their totals due to rounding.

[1] Doyle rule.

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HaHeJoMaSh = Hancock, Hendricks, Johnson, Marion and Shelby Counties.
JaLaNe = Jasper, Lake and Newton Counties.
PuStSt = Pulaski, St. Joseph and Starke Counties.

Table 17. -- Net volume of all live trees and salvable dead trees on timberland by class of timber and major species group, Indiana, 1998

(In thousand cubic feet)

Class of timber	All species	Major species group: Pine	Other softwoods	Soft hardwoods	Hard hardwoods
Live trees					
Growing stock trees					
Sawtimber					
Saw-log portion	4,851,913	158,061	23,359	1,635,856	3,034,637
Upper stem portion	624,304	18,799	3,274	195,894	406,338
Total	5,476,217	176,859	26,633	1,831,751	3,440,974
Poletimber	1,424,078	47,342	26,948	563,840	785,948
All growing stock trees	6,900,295	224,201	53,581	2,395,591	4,226,922
Cull trees					
Short-log trees	217,937	1,933	1,221	84,791	129,992
Rough trees[1]					
Sawtimber size	290,209	1,774	7,692	105,717	175,026
Poletimber size	207,741	1,537	4,496	113,279	88,429
Total	497,951	3,312	12,189	218,996	263,454
Rotten trees[1]					
Sawtimber size	173,905	258	236	59,087	114,323
Poletimber size	19,092	49	184	10,590	8,269
Total	192,997	307	420	69,678	122,592
All live cull trees	908,885	5,552	13,830	373,464	516,039
All live trees	7,809,180	229,753	67,411	2,769,055	4,742,961
Salvable dead trees					
Sawtimber size	42,843	2,618	161	16,323	23,742
Poletimber size	34,309	2,507	942	18,890	11,970
All salvable dead trees	77,152	5,125	1,102	35,212	35,712
All classes	7,886,332	234,878	68,514	2,804,267	4,778,673

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[1] Includes noncommercial species.

Table 18. -- Net volume of all live trees and growing-stock trees on timberland by ownership class and major species group, Indiana, 1998

(In thousand cubic feet)

Ownership class	All live trees					Growing-stock trees				
		Major species group					Major species group			
	All species	Pine	Other softwoods	Soft hardwoods	Hard hardwoods	All species	Pine	Other softwoods	Soft hardwoods	Hard hardwoods
National forest	326,678	25,707	4,371	81,172	215,428	309,436	25,597	3,834	75,332	204,673
Other federal	317,566	704	1,544	126,124	189,195	286,878	704	882	106,650	178,643
State	475,759	31,052	3,197	118,646	322,864	446,726	29,976	2,573	107,517	306,660
County and municipal	18,092	69	--	6,314	11,709	17,228	69	--	5,705	11,454
Forest industry	31,890	--	--	12,822	19,067	26,411	--	--	12,349	14,061
Corporate	710,871	36,103	1,673	243,843	429,253	627,034	35,448	946	214,964	375,676
Individual	5,928,324	136,118	56,627	2,178,322	3,557,257	5,186,581	132,408	45,346	1,871,262	3,137,566
All ownerships	7,809,180	229,753	67,411	2,767,243	4,744,772	6,900,295	224,201	53,581	2,393,779	4,228,734

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Table 19. -- Net volume of growing stock on timberland by forest type group/local type and major species group, Indiana, 1998

(In thousand cubic feet)

Forest type group/ local type	All species	Major species group: Pine	Other softwoods	Soft hardwoods	Hard hardwoods
Softwood type groups					
White-red-jack pine					
White pine	70,355	55,921	--	12,590	1,845
Total	70,355	55,921	--	12,590	1,845
Loblolly-shortleaf pine					
Shortleaf-virginia pine	93,722	75,487	816	11,579	5,839
Total	93,722	75,487	816	11,579	5,839
Oak-pine					
Eastern redcedar	13,592	--	7,943	2,927	2,722
Eastern redcedar-hardwood	74,588	5,728	21,015	12,930	34,915
Oak-pine	117,962	56,796	667	41,694	18,805
Total	206,142	62,524	29,624	57,551	56,442
All softwood types	370,219	193,932	30,440	81,720	64,127
Hardwood type groups					
Oak-hickory					
Oak-hickory	2,773,852	18,122	11,890	467,548	2,276,292
Total	2,773,852	18,122	11,890	467,548	2,276,292
Oak-gum-cypress					
Oak-gum-cypress	79,536	--	--	31,032	48,504
Total	79,536	--	--	31,032	48,504
Elm-ash-cottonwood					
Elm-ash-cottonwood	988,023	3,034	4,817	731,288	248,884
Total	988,023	3,034	4,817	731,288	248,884
Maple-beech-birch					
Maple-beech	2,323,927	7,671	6,044	869,104	1,441,107
Cherry-ash-yellow poplar	356,741	1,441	390	208,223	146,687
Total	2,680,668	9,113	6,434	1,077,327	1,587,794
Aspen-birch					
Aspen-birch	7,997	--	--	6,675	1,322
Total	7,997	--	--	6,675	1,322
All hardwood types	6,530,076	30,269	23,141	2,313,871	4,162,796
Nonstocked	--	--	--	--	--
All forest types	6,900,295	224,201	53,581	2,395,591	4,226,922

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Table 20. -- Average annual net growth of growing stock and sawtimber (International 1/4-inch rule) on timberland by Forest Survey Unit, county/county group, and major species group, Indiana, 1986-1997

Forest Survey Unit and county/county group	Growing stock					Sawtimber				
		Major species group					Major species group			
	All species	Pine	Other softwoods	Soft hardwoods	Hard hardwoods	All species	Pine	Other softwoods	Soft hardwoods	Hard hardwoods
	(In thousand cubic feet)					(In thousand board feet) [1]				
Lower Wabash Unit										
Clay	2,569	120	--	1,303	1,146	11,611	450	--	5,268	5,892
Daviess, Knox	3,722	--	--	2,695	1,027	17,076	--	--	12,494	4,582
Gibson	1,842	--	--	823	1,019	7,106	--	--	2,898	4,208
Greene	5,592	275	12	2,734	2,571	21,545	1,365	-4	9,818	10,365
Martin	5,696	39	27	2,184	3,447	24,453	128	87	9,220	15,018
Parke	4,941	--	--	2,268	2,674	21,060	--	--	9,365	11,695
Pike	3,649	695	11	2,122	821	15,150	4,346	--	7,750	3,055
Posey, Vanderburgh	3,203	75	279	1,419	1,431	14,400	219	1,211	5,958	7,011
Putnam	6,056	--	3	2,441	3,612	27,986	--	12	10,643	17,331
Sullivan	2,736	14	--	1,260	1,463	11,523	--	--	4,885	6,639
Vermillion	2,271	--	--	905	1,365	10,766	--	--	4,586	6,180
Vigo	3,602	--	--	2,248	1,354	14,296	--	--	8,830	5,466
Total	45,880	1,218	331	22,401	21,929	196,972	6,508	1,306	91,715	97,442
Knobs Unit										
Brown	7,672	133	7	1,692	5,840	33,245	877	--	5,494	26,874
Clark, Scott	5,864	847	32	1,820	3,166	27,123	5,060	204	7,548	14,311
Crawford	5,733	3	265	1,457	4,007	26,307	21	818	6,656	18,812
Dubois	4,204	239	1	1,954	2,010	18,832	1,370	99	8,193	9,170
Floyd,Harrison	6,563	524	181	2,004	3,854	28,033	2,162	705	7,737	17,429
Jackson	5,938	193	--	2,382	3,362	23,121	871	--	9,011	13,239
Lawrence	6,358	118	12	2,517	3,711	29,664	460	--	10,840	18,364
Monroe	6,159	207	65	2,260	3,627	28,171	1,620	129	9,686	16,736
Morgan	5,015	128	12	2,610	2,266	20,818	1,081	--	10,016	9,722
Orange	7,518	672	128	2,647	4,071	33,702	2,101	461	11,956	19,185
Owen	5,725	36	9	2,724	2,956	24,309	100	--	12,140	12,069
Perry	8,184	978	104	1,738	5,364	38,115	4,704	438	6,586	26,386
Spencer	2,345	--	--	964	1,382	11,849	--	--	4,355	7,493
Warrick	2,788	95	23	1,180	1,490	11,425	435	--	4,838	6,152
Washington	6,371	330	111	2,105	3,825	29,552	1,713	431	8,396	19,012
Total	86,437	4,502	951	30,055	50,929	384,266	22,575	3,284	123,452	234,955
Upland Flats Unit										
Dearborn	2,923	--	204	499	2,219	10,456	--	36	1,473	8,946
Fayette, Union	1,805	--	66	734	1,004	7,027	--	--	3,138	3,888
Franklin	6,862	--	4	3,047	3,812	25,748	--	18	10,178	15,552
Jefferson	5,790	128	393	2,531	2,738	20,826	414	722	10,051	9,639
Jennings	3,409	21	4	1,678	1,706	14,511	-32	-7	6,464	8,087
Ohio, Switzerland	2,596	7	303	867	1,420	8,006	34	508	2,423	5,040
Ripley	5,734	--	40	1,206	4,488	24,781	--	35	4,467	20,279
Total	29,118	156	1,014	10,562	17,386	111,355	416	1,313	38,195	71,431

(Table 20 continued on next page)

(Table 20 continued)

Forest Survey Unit and county/county group	Growing stock					Sawtimber				
		Major species group					Major species group			
	All species	Pine	Other softwoods	Soft hardwoods	Hard hardwoods	All species	Pine	Other softwoods	Soft hardwoods	Hard hardwoods
	(In thousand cubic feet)					(In thousand board feet) [1]				
Northern Unit										
AdHuWe	3,054	--	--	1,182	1,871	10,405	--	--	2,999	7,406
Allen	1,814	56	--	587	1,172	7,864	304	--	1,933	5,627
Bartholomew	2,953	--	--	1,440	1,513	11,377	--	--	6,086	5,290
BeFoWa	4,840	--	--	1,821	3,019	21,145	--	--	7,961	13,184
BlDeGrMa	2,904	18	--	891	1,995	11,908	--	--	3,570	8,339
BoClHaTi	2,179	--	--	791	1,388	7,334	--	--	2,651	4,683
CaTiWh	2,861	--	16	1,051	1,794	12,524	--	197	3,972	8,355
CaHoMiWa	5,336	463	--	2,079	2,793	22,238	3,620	--	6,972	11,646
DeHeRuWa	4,995	--	--	2,326	2,669	23,863	--	--	9,788	14,075
De Kalb, Steuben	2,205	--	--	1,028	1,177	7,913	--	--	2,700	5,213
ElNoWh	5,016	-18	--	2,663	2,370	17,191	315	--	7,132	9,745
Fulton, Marshall	1,894	--	--	1,024	870	8,169	--	--	4,450	3,719
HaHeJoMaSh	3,735	--	--	1,632	2,103	12,763	--	--	5,587	7,177
JaLaNe	2,388	34	--	860	1,495	7,257	11	--	1,962	5,284
Jay, Randolph	2,727	--	--	576	2,151	8,735	--	--	649	8,087
Kosciusko	2,597	--	--	1,604	993	10,952	--	--	6,492	4,460
La Grange	2,186	9	28	1,446	702	7,293	48	-10	4,804	2,451
La Porte	3,974	--	--	2,217	1,757	14,585	--	--	7,455	7,130
Montgomery	1,827	--	--	616	1,211	6,470	--	--	2,506	3,964
Porter	1,660	--	--	706	954	5,696	--	--	2,652	3,044
PuStSt	3,746	--	5	1,760	1,981	14,606	--	--	6,273	8,333
Total	64,892	562	50	28,300	35,980	250,289	4,300	187	98,590	147,212
All counties	226,327	6,438	2,346	91,318	126,225	942,881	33,799	6,090	351,952	551,040

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Table 20A. -- Average annual net growth of growing stock and sawtimber (Doyle rule) on timberland by Forest Survey Unit, county/county group, and major species group, Indiana, 1986-1997

Forest Survey Unit and county/county group	Growing stock					Sawtimber				
		Major species group					Major species group			
	All species	Pine	Other softwoods	Soft hardwoods	Hard hardwoods	All species	Pine	Other softwoods	Soft hardwoods	Hard hardwoods
	(In thousand cubic feet)					(In thousand board feet) [1]				
Lower Wabash Unit										
Clay	2,569	120	--	1,303	1,146	6,438	110	--	3,071	3,257
Daviess, Knox	3,722	--	--	2,695	1,027	10,809	--	--	8,091	2,718
Gibson	1,842	--	--	823	1,019	4,087	--	--	1,723	2,364
Greene	5,592	275	12	2,734	2,571	11,380	636	-1	5,149	5,597
Martin	5,696	39	27	2,184	3,447	14,350	51	30	5,647	8,622
Parke	4,941	--	--	2,268	2,674	12,006	--	--	5,319	6,687
Pike	3,649	695	11	2,122	821	7,586	2,059	--	3,878	1,650
Posey, Vanderburgh	3,203	75	279	1,419	1,431	8,559	92	683	3,727	4,057
Putnam	6,056	--	3	2,441	3,612	15,614	--	4	6,260	9,350
Sullivan	2,736	14	--	1,260	1,463	6,387	--	--	2,802	3,584
Vermillion	2,271	--	--	905	1,365	6,160	--	--	2,651	3,509
Vigo	3,602	--	--	2,248	1,354	8,670	--	--	5,488	3,182
Total	45,880	1,218	331	22,401	21,929	112,046	2,948	715	53,805	54,578
Knobs Unit										
Brown	7,672	133	7	1,692	5,840	19,047	407	--	3,064	15,576
Clark, Scott	5,864	847	32	1,820	3,166	14,504	2,266	71	4,012	8,155
Crawford	5,733	3	265	1,457	4,007	13,694	10	295	3,440	9,949
Dubois	4,204	239	1	1,954	2,010	10,490	583	34	5,117	4,756
Floyd,Harrison	6,563	524	181	2,004	3,854	15,656	971	281	4,651	9,752
Jackson	5,938	193	--	2,382	3,362	13,269	353	--	5,264	7,653
Lawrence	6,358	118	12	2,517	3,711	16,417	202	--	6,066	10,150
Monroe	6,159	207	65	2,260	3,627	15,817	678	44	6,097	8,999
Morgan	5,015	128	12	2,610	2,266	12,009	596	--	5,910	5,503
Orange	7,518	672	128	2,647	4,071	18,342	869	193	6,613	10,667
Owen	5,725	36	9	2,724	2,956	13,327	38	--	6,645	6,644
Perry	8,184	978	104	1,738	5,364	19,604	2,007	189	3,496	13,912
Spencer	2,345	--	--	964	1,382	6,539	--	--	2,353	4,185
Warrick	2,788	95	23	1,180	1,490	6,431	160	--	2,963	3,308
Washington	6,371	330	111	2,105	3,825	16,051	763	150	5,111	10,027
Total	86,437	4,502	951	30,055	50,929	211,197	9,902	1,257	70,802	129,237
Upland Flats Unit										
Dearborn	2,923	--	204	499	2,219	5,963	--	16	933	5,013
Fayette, Union	1,805	--	66	734	1,004	4,378	--	--	2,079	2,299
Franklin	6,862	--	4	3,047	3,812	15,890	--	6	6,339	9,545
Jefferson	5,790	128	393	2,531	2,738	11,688	163	344	6,170	5,011
Jennings	3,409	21	4	1,678	1,706	8,154	-11	-5	3,690	4,481
Ohio, Switzerland	2,596	7	303	867	1,420	4,235	20	186	1,401	2,628
Ripley	5,734	--	40	1,206	4,488	14,468	--	17	2,480	11,971
Total	29,118	156	1,014	10,562	17,386	64,776	172	564	23,092	40,948

(Table 20A continued on next page)

(Table 20A continued)

Forest Survey Unit and county/county group	Growing stock					Sawtimber				
		Major species group					Major species group			
	All species	Pine	Other softwoods	Soft hardwoods	Hard hardwoods	All species	Pine	Other softwoods	Soft hardwoods	Hard hardwoods
	(In thousand cubic feet)					(In thousand board feet) [1]				
Northern Unit										
AdHuWe	3,054	--	--	1,182	1,871	5,766	--	--	1,750	4,016
Allen	1,814	56	--	587	1,172	4,683	132	--	1,025	3,526
Bartholomew	2,953	--	--	1,440	1,513	6,378	--	--	3,250	3,127
BeFoWa	4,840	--	--	1,821	3,019	13,239	--	--	5,157	8,083
BlDeGrMa	2,904	18	--	891	1,995	6,472	--	--	1,963	4,509
BoClHaTi	2,179	--	--	791	1,388	4,224	--	--	1,490	2,734
CaTiWh	2,861	--	16	1,051	1,794	7,192	--	68	2,447	4,677
CaHoMiWa	5,336	463	--	2,079	2,793	12,202	1,565	--	3,654	6,983
DeHeRuWa	4,995	--	--	2,326	2,669	13,098	--	--	5,735	7,363
De Kalb, Steuben	2,205	--	--	1,028	1,177	4,204	--	--	1,444	2,760
ElNoWh	5,016	-18	--	2,663	2,370	9,792	109	--	3,806	5,877
Fulton, Marshall	1,894	--	--	1,024	870	4,697	--	--	2,520	2,178
HaHeJoMaSh	3,735	--	--	1,632	2,103	7,867	--	--	3,618	4,250
JaLaNe	2,388	34	--	860	1,495	4,372	10	--	1,140	3,222
Jay, Randolph	2,727	--	--	576	2,151	5,974	--	--	265	5,710
Kosciusko	2,597	--	--	1,604	993	6,034	--	--	3,585	2,450
La Grange	2,186	9	28	1,446	702	4,135	33	-5	2,724	1,382
La Porte	3,974	--	--	2,217	1,757	9,312	--	--	4,605	4,708
Montgomery	1,827	--	--	616	1,211	3,571	--	--	1,435	2,136
Porter	1,660	--	--	706	954	3,178	--	--	1,529	1,649
PuStSt	3,746	--	5	1,760	1,981	8,605	--	--	3,687	4,918
Total	64,892	562	50	28,300	35,980	144,997	1,850	63	56,826	86,259
All counties	226,327	6,438	2,346	91,318	126,225	533,016	14,872	2,599	204,525	311,020

All table cells without observations in the inventory sample are indicated by --. Cells with observations smaller than the precision reported in the table are shown as zero. Columns and rows may not add to their totals due to rounding.

[1] Doyle rule.

AdHuWe = Adams, Huntington and Wells Counties.
BeFoWa = Benton, Fountain and Warren Counties.
BlDeGrMa = Blackford, Delaware, Grant and Madison Counties.
BoClHaTi = Boone, Clinton, Hamilton and Tipton Counties.
CaTiWh = Carroll, Tippecanoe and White Counties.
CaHoMiWa = Cass, Howard, Miami and Wabash Counties.
DeHeRuWa = Decatur, Henry, Rush and Wayne Counties.
ElNoWh = Elkart, Noble and Whitley Counties.
HaHeJoMaSh = Hancock, Hendricks, Johnson, Marion and Shelby Counties.
JaLaNe = Jasper, Lake and Newton Counties.
PuStSt = Pulaski, St. Joseph and Starke Counties.

Table 21. -- Average annual removals of growing stock and sawtimber (International 1/4-inch rule) on timberland by Forest Survey Unit, county/county group, and major species group, Indiana, 1986-1997

Forest Survey Unit and county/county group	Growing stock					Sawtimber				
		Major species group					Major species group			
	All species	Pine	Other softwoods	Soft hardwoods	Hard hardwoods	All species	Pine	Other softwoods	Soft hardwoods	Hard hardwoods
	(In thousand cubic feet)					(In thousand board feet) [1]				
Lower Wabash Unit										
Clay	848	--	--	454	394	3,542	--	--	1,684	1,858
Daviess, Knox	3,519	--	--	2,324	1,194	13,917	--	--	9,314	4,603
Gibson	--	--	--	--	--	--	--	--	--	--
Greene	2,312	--	--	1,053	1,259	8,555	--	--	4,454	4,101
Martin	2,367	--	--	854	1,513	11,469	--	--	4,275	7,195
Parke	3,508	--	--	1,400	2,108	13,752	--	--	5,680	8,072
Pike	1,018	--	--	114	904	3,717	--	--	187	3,530
Posey, Vanderburgh	2,556	--	--	1,690	866	9,054	--	--	6,613	2,441
Putnam	1,738	--	--	386	1,352	7,687	--	--	1,997	5,690
Sullivan	568	--	--	--	568	2,713	--	--	--	2,713
Vermillion	2,555	--	--	897	1,658	9,634	--	--	3,054	6,580
Vigo	868	--	--	594	274	4,064	--	--	2,914	1,150
Total	21,855	--	--	9,765	12,091	88,105	--	--	40,171	47,933
Knobs Unit										
Brown	2,513	34	--	467	2,011	11,271	174	--	2,084	9,014
Clark, Scott	2,099	31	--	628	1,440	8,296	--	--	3,008	5,288
Crawford	4,156	--	--	1,470	2,687	19,672	--	--	7,503	12,169
Dubois	455	--	--	381	73	1,252	--	--	998	254
Floyd,Harrison	1,163	--	--	540	623	4,434	--	--	1,707	2,727
Jackson	5,693	21	--	3,818	1,853	25,555	101	--	17,955	7,499
Lawrence	3,978	--	--	1,469	2,510	18,021	--	--	6,912	11,109
Monroe	1,535	--	--	341	1,193	6,690	--	--	1,103	5,587
Morgan	2,441	--	--	1,310	1,131	10,657	--	--	6,174	4,483
Orange	4,321	--	141	2,156	2,024	20,147	--	379	10,717	9,051
Owen	2,899	--	--	1,205	1,694	13,394	--	--	5,536	7,859
Perry	2,883	214	--	702	1,966	12,690	319	--	3,503	8,869
Spencer	1,339	--	--	351	988	6,250	--	--	1,575	4,675
Warrick	1,427	--	--	605	822	3,855	--	--	1,130	2,724
Washington	2,122	--	--	508	1,614	10,200	--	--	2,464	7,736
Total	39,023	300	141	15,953	22,629	172,384	593	379	72,368	99,044
Upland Flats Unit										
Dearborn	814	--	--	690	124	4,163	--	--	3,559	604
Fayette, Union	1,068	--	--	718	350	4,322	--	--	3,154	1,167
Franklin	1,552	--	--	242	1,310	5,250	--	--	758	4,492
Jefferson	663	--	20	116	526	2,656	--	--	381	2,275
Jennings	2,665	--	--	1,293	1,372	12,593	--	--	6,086	6,508
Ohio, Switzerland	83	--	22	--	61	--	--	--	--	--
Ripley	3,081	--	--	1,659	1,422	14,980	--	--	8,655	6,325
Total	9,926	--	43	4,719	5,165	43,963	--	--	22,593	21,370

(Table 21 continued on next page)

(Table 21 continued)

Forest Survey Unit and county/county group	Growing stock					Sawtimber				
		Major species group					Major species group			
	All species	Pine	Other softwoods	Soft hardwoods	Hard hardwoods	All species	Pine	Other softwoods	Soft hardwoods	Hard hardwoods
	(In thousand cubic feet)					(In thousand board feet) [1]				
Northern Unit										
AdHuWe	597	--	--	--	597	2,707	--	--	--	2,707
Allen	122	--	--	69	53	276	--	--	276	--
Bartholomew	1,560	--	--	346	1,214	6,100	--	--	1,752	4,348
BeFoWa	53	--	--	--	53	--	--	--	--	--
BlDeGrMa	913	--	--	289	624	3,337	--	--	509	2,829
BoClHaTi	25	--	--	25	--	--	--	--	--	--
CaTiWh	856	--	--	328	528	3,954	--	--	1,468	2,486
CaHoMiWa	1,534	--	--	519	1,015	6,944	--	--	2,172	4,772
DeHeRuWa	2,547	--	--	1,570	977	12,130	--	--	7,997	4,133
De Kalb, Steuben	728	--	--	240	488	2,965	--	--	620	2,345
ElNoWh	3,969	--	--	1,093	2,876	15,084	--	--	3,958	11,126
Fulton, Marshall	197	--	--	--	197	736	--	--	--	736
HaHeJoMaSh	874	--	--	535	339	3,821	--	--	2,302	1,518
JaLaNe	82	--	--	--	82	117	--	--	--	117
Jay, Randolph	684	--	--	28	656	2,876	--	--	--	2,876
Kosciusko	661	--	--	130	530	2,872	--	--	504	2,367
La Grange	514	--	--	437	77	1,653	--	--	1,357	296
La Porte	434	--	--	171	264	1,645	--	--	435	1,210
Montgomery	350	--	--	36	314	1,459	--	--	--	1,459
Porter	214	--	--	--	214	973	--	--	--	973
PuStSt	504	--	23	101	380	1,519	--	--	187	1,332
Total	17,417	--	23	5,917	11,478	71,168	--	--	23,537	47,630
All counties	88,222	300	206	36,353	51,363	375,619	593	379	158,670	215,978

All table cells without observations in the inventory sample are indicated by --. Cells with observations smaller than the precision reported in the table are shown as zero. Columns and rows may not add to their totals due to rounding.

[1] International 1/4-inch rule.

AdHuWe = Adams, Huntington and Wells Counties.
BeFoWa = Benton, Fountain and Warren Counties.
BlDeGrMa = Blackford, Delaware, Grant and Madison Counties.
BoClHaTi = Boone, Clinton, Hamilton and Tipton Counties.
CaTiWh = Carroll, Tippecanoe and White Counties.
CaHoMiWa = Cass, Howard, Miami and Wabash Counties.
DeHeRuWa = Decatur, Henry, Rush and Wayne Counties.
ElNoWh = Elkart, Noble and Whitley Counties.
HaHeJoMaSh = Hancock, Hendricks, Johnson, Marion and Shelby Counties.
JaLaNe = Jasper, Lake and Newton Counties.
PuStSt = Pulaski, St. Joseph and Starke Counties.

Table 21A. -- Average annual removals of growing stock and sawtimber (Doyle rule) on timberland by Forest Survey Unit, county/county group, and major species group, Indiana, 1986-1997

Forest Survey Unit and county/county group	Growing stock					Sawtimber				
		Major species group					Major species group			
	All species	Pine	Other softwoods	Soft hardwoods	Hard hardwoods	All species	Pine	Other softwoods	Soft hardwoods	Hard hardwoods
	(In thousand cubic feet)					(In thousand board feet) [1]				
Lower Wabash Unit										
Clay	848	--	--	454	394	1,963	--	--	972	991
Daviess, Knox	3,519	--	--	2,324	1,194	8,609	--	--	5,509	3,100
Gibson	--	--	--	--	--	--	--	--	--	--
Greene	2,312	--	--	1,053	1,259	4,901	--	--	2,573	2,328
Martin	2,367	--	--	854	1,513	7,505	--	--	3,028	4,477
Parke	3,508	--	--	1,400	2,108	9,294	--	--	3,979	5,315
Pike	1,018	--	--	114	904	2,321	--	--	78	2,243
Posey, Vanderburgh	2,556	--	--	1,690	866	6,082	--	--	4,432	1,650
Putnam	1,738	--	--	386	1,352	5,008	--	--	1,422	3,585
Sullivan	568	--	--	--	568	1,954	--	--	--	1,954
Vermillion	2,555	--	--	897	1,658	6,833	--	--	2,308	4,525
Vigo	868	--	--	594	274	3,237	--	--	2,338	899
Total	21,855	--	--	9,765	12,091	57,707	--	--	26,641	31,067
Knobs Unit										
Brown	2,513	34	--	467	2,011	8,050	104	--	1,436	6,509
Clark, Scott	2,099	31	--	628	1,440	5,472	--	--	1,893	3,579
Crawford	4,156	--	--	1,470	2,687	12,798	--	--	4,615	8,184
Dubois	455	--	--	381	73	984	--	--	817	167
Floyd,Harrison	1,163	--	--	540	623	3,237	--	--	1,256	1,981
Jackson	5,693	21	--	3,818	1,853	19,177	35	--	14,342	4,801
Lawrence	3,978	--	--	1,469	2,510	13,007	--	--	4,895	8,112
Monroe	1,535	--	--	341	1,193	4,278	--	--	631	3,647
Morgan	2,441	--	--	1,310	1,131	6,166	--	--	3,417	2,749
Orange	4,321	--	141	2,156	2,024	13,255	--	179	7,014	6,062
Owen	2,899	--	--	1,205	1,694	8,873	--	--	3,391	5,482
Perry	2,883	214	--	702	1,966	8,175	117	--	2,247	5,811
Spencer	1,339	--	--	351	988	4,065	--	--	940	3,125
Warrick	1,427	--	--	605	822	2,398	--	--	649	1,749
Washington	2,122	--	--	508	1,614	6,234	--	--	1,374	4,861
Total	39,023	300	141	15,953	22,629	116,170	256	179	48,916	66,820
Upland Flats Unit										
Dearborn	814	--	--	690	124	3,516	--	--	2,944	572
Fayette, Union	1,068	--	--	718	350	3,833	--	--	2,972	861
Franklin	1,552	--	--	242	1,310	3,661	--	--	456	3,205
Jefferson	663	--	20	116	526	1,759	--	--	234	1,525
Jennings	2,665	--	--	1,293	1,372	8,642	--	--	4,187	4,455
Ohio, Switzerland	83	--	22	--	61	--	--	--	--	--
Ripley	3,081	--	--	1,659	1,422	10,191	--	--	5,666	4,525
Total	9,926	--	43	4,719	5,165	31,603	--	--	16,459	15,144

(Table 21A continued on next page)

(Table 21A continued)

Forest Survey Unit and county/county group	Growing stock					Sawtimber				
		Major species group					Major species group			
	All species	Pine	Other softwoods	Soft hardwoods	Hard hardwoods	All species	Pine	Other softwoods	Soft hardwoods	Hard hardwoods
	(In thousand cubic feet)					(In thousand board feet) [1]				
Northern Unit										
AdHuWe	597	--	--	--	597	1,847	--	--	--	1,847
Allen	122	--	--	69	53	313	--	--	313	--
Bartholomew	1,560	--	--	346	1,214	3,835	--	--	1,104	2,732
BeFoWa	53	--	--	--	53	--	--	--	--	--
BlDeGrMa	913	--	--	289	624	2,298	--	--	323	1,976
BoClHaTi	25	--	--	25	--	--	--	--	--	--
CaTiWh	856	--	--	328	528	3,285	--	--	1,506	1,779
CaHoMiWa	1,534	--	--	519	1,015	5,021	--	--	1,893	3,128
DeHeRuWa	2,547	--	--	1,570	977	7,300	--	--	4,644	2,656
De Kalb, Steuben	728	--	--	240	488	1,969	--	--	347	1,621
ElNoWh	3,969	--	--	1,093	2,876	10,495	--	--	2,626	7,870
Fulton, Marshall	197	--	--	--	197	657	--	--	--	657
HaHeJoMaSh	874	--	--	535	339	2,523	--	--	1,717	806
JaLaNe	82	--	--	--	82	49	--	--	--	49
Jay, Randolph	684	--	--	28	656	2,480	--	--	--	2,480
Kosciusko	661	--	--	130	530	2,127	--	--	362	1,765
La Grange	514	--	--	437	77	1,142	--	--	806	336
La Porte	434	--	--	171	264	1,369	--	--	360	1,009
Montgomery	350	--	--	36	314	846	--	--	--	846
Porter	214	--	--	--	214	792	--	--	--	792
PuStSt	504	--	23	101	380	733	--	--	96	637
Total	17,417	--	23	5,917	11,478	49,082	--	--	16,097	32,985
All counties	88,222	300	206	36,353	51,363	254,563	256	179	108,113	146,015

All table cells without observations in the inventory sample are indicated by --. Cells with observations smaller than the precision reported in the table are shown as zero. Columns and rows may not add to their totals due to rounding.

[1] Doyle rule.

AdHuWe = Adams, Huntington and Wells Counties.
BeFoWa = Benton, Fountain and Warren Counties.
BlDeGrMa = Blackford, Delaware, Grant and Madison Counties.
BoClHaTi = Boone, Clinton, Hamilton and Tipton Counties.
CaTiWh = Carroll, Tippecanoe and White Counties.
CaHoMiWa = Cass, Howard, Miami and Wabash Counties.
DeHeRuWa = Decatur, Henry, Rush and Wayne Counties.
ElNoWh = Elkart, Noble and Whitley Counties.
HaHeJoMaSh = Hancock, Hendricks, Johnson, Marion and Shelby Counties.
JaLaNe = Jasper, Lake and Newton Counties.
PuStSt = Pulaski, St. Joseph and Starke Counties.

Table 22. -- Average annual net growth and average annual removals of growing stock and sawtimber (International 1/4-inch rule) on timberland by species group, Indiana, 1986-1997

Species group	Growing Stock		Sawtimber	
	Average annual net growth	Average annual removals	Average annual net growth	Average annual removals
	(In thousand cubic feet)		(In thousand board feet)[1]	
Softwoods				
Jack pine	110	--	501	--
Red pine	77	--	712	--
White pine	2,536	165	14,127	269
Shortleaf pine	1,036	71	6,300	151
Virginia pine	2,590	65	11,770	174
Baldcypress	257	--	1,211	--
Eastern redcedar	2,075	206	4,889	379
Other softwoods	103	--	378	--
Total softwoods	8,784	505	39,889	972
Hardwoods				
Select white oak	19,303	10,647	87,262	46,768
Other white oak	2,796	773	13,872	3,816
Select red oak	12,339	6,460	58,147	29,688
Other red oak	18,350	10,522	84,905	47,358
Select hickory	7,083	3,255	34,741	11,638
Other hickory	10,338	3,155	53,805	12,696
Basswood	2,311	903	9,636	3,681
Beech	6,051	3,175	28,367	14,483
Yellow birch	49	--	144	--
Hard maple	21,954	4,297	82,694	15,932
Soft maple	16,106	3,157	54,915	10,890
Elm	7,667	1,544	16,349	2,991
Black ash	434	151	1,607	--
White & green ash	17,847	5,649	71,127	21,818
Sycamore	10,568	4,756	47,117	21,372
Cottonwood	5,711	816	27,212	3,439
Willow	742	421	1,791	1,483
Hackberry	3,203	481	9,396	1,471
Bigtooth aspen	1,146	752	4,388	3,378
Quaking aspen	197	--	417	--
River birch	717	85	1,552	391
Sweetgum	2,493	1,305	10,051	4,696
Tupelo	1,512	269	5,163	1,213
Black cherry	7,542	2,185	24,535	8,348
Black walnut	6,142	2,502	24,717	9,553
Butternut	107	35	340	--
Yellow-poplar	27,440	17,737	130,061	89,583
Other hardwoods	7,451	2,684	18,680	7,964
Total hardwoods	217,600	87,716	902,992	374,647
All species	226,327	88,222	942,881	375,619

All table cells without observations in the inventory sample are indicated by --. Cells with observations smaller than the precision reported in the table are shown as zero. Columns and rows may not add to their totals due to rounding.

[1] International 1/4-inch rule.

Table 22A. -- Average annual net growth and average annual removals of growing stock and sawtimber (Doyle rule) on timberland by species group, Indiana, 1986-1997

Species group	Growing Stock		Sawtimber	
	Average annual net growth	Average annual removals	Average annual net growth	Average annual removals
	(In thousand cubic feet)		(In thousand board feet)[1]	
Softwoods				
Jack pine	110	--	209	--
Red pine	77	--	246	--
White pine	2,536	165	6,593	93
Shortleaf pine	1,036	71	2,763	59
Virginia pine	2,590	65	4,927	104
Baldcypress	257	--	683	--
Eastern redcedar	2,075	206	1,922	179
Other softwoods	103	--	129	--
Total softwoods	8,784	505	17,471	435
Hardwoods				
Select white oak	19,303	10,647	51,672	33,010
Other white oak	2,796	773	7,708	2,238
Select red oak	12,339	6,460	36,489	20,934
Other red oak	18,350	10,522	51,550	33,559
Select hickory	7,083	3,255	17,108	7,421
Other hickory	10,338	3,155	27,102	7,722
Basswood	2,311	903	5,216	2,878
Beech	6,051	3,175	18,876	10,043
Yellow birch	49	--	95	--
Hard maple	21,954	4,297	43,986	9,968
Soft maple	16,106	3,157	30,962	7,358
Elm	7,667	1,544	7,645	1,741
Black ash	434	151	750	--
White & green ash	17,847	5,649	38,221	14,293
Sycamore	10,568	4,756	30,734	16,567
Cottonwood	5,711	816	19,104	2,908
Willow	742	421	869	1,078
Hackberry	3,203	481	5,500	988
Bigtooth aspen	1,146	752	2,232	1,837
Quaking aspen	197	--	194	--
River birch	717	85	674	211
Sweetgum	2,493	1,305	5,105	3,045
Tupelo	1,512	269	2,515	685
Black cherry	7,542	2,185	12,725	5,041
Black walnut	6,142	2,502	12,655	5,569
Butternut	107	35	175	--
Yellow-poplar	27,440	17,737	76,524	60,595
Other hardwoods	7,451	2,684	9,158	4,438
Total hardwoods	217,600	87,716	515,545	254,128
All species	226,327	88,222	533,016	254,563

All table cells without observations in the inventory sample are indicated by --. Cells with observations smaller than the precision reported in the table are shown as zero. Columns and rows may not add to their totals due to rounding.

[1] Doyle rule.

Table 23. -- Average annual mortality of growing stock and sawtimber (International 1/4-inch rule) on timberland by species group, Indiana, 1986-1997

Species group	Growing stock average annual mortality	Sawtimber average annual mortality
	(In thousand cubic feet)	(In thousand board feet)[1]
Softwoods		
Jack pine	--	--
Red pine	219	251
White pine	425	676
Shortleaf pine	222	276
Virginia pine	1,372	3,672
Baldcypress	31	--
Eastern redcedar	207	631
Other softwoods	320	104
Total softwoods	2,797	5,610
Hardwoods		
Select white oak	4,057	10,357
Other white oak	1,082	4,066
Select red oak	2,800	10,296
Other red oak	5,496	16,054
Select hickory	2,066	5,514
Other hickory	2,579	8,364
Basswood	731	2,345
Beech	1,744	6,694
Yellow birch	--	--
Hard maple	4,034	11,563
Soft maple	2,290	5,627
Elm	8,228	14,509
Black ash	55	--
White & green ash	6,196	15,255
Sycamore	1,767	5,656
Cottonwood	1,988	7,012
Willow	623	1,164
Hackberry	695	2,178
Bigtooth aspen	513	829
Quaking aspen	65	134
River birch	355	189
Sweetgum	761	1,921
Tupelo	321	918
Black cherry	2,338	5,842
Black walnut	1,026	2,023
Butternut	51	17
Yellow-poplar	2,206	5,762
Other hardwoods	4,532	6,648
Total hardwoods	58,597	150,937
All species	61,409	156,547

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[1] International 1/4-inch rule.

Table 23A. -- Average annual mortality of growing stock and sawtimber (Doyle rule) on timberland by species group, Indiana, 1986-1997

Species group	Growing stock average annual mortality	Sawtimber average annual mortality
	(In thousand cubic feet)	(In thousand board feet)[1]
Softwoods		
Jack pine	--	--
Red pine	219	87
White pine	425	275
Shortleaf pine	222	114
Virginia pine	1,372	1,956
Baldcypress	31	--
Eastern redcedar	207	252
Other softwoods	320	36
Total softwoods	2,797	2,719
Hardwoods		
Select white oak	4,057	8,699
Other white oak	1,082	2,321
Select red oak	2,800	8,606
Other red oak	5,496	10,579
Select hickory	2,066	3,421
Other hickory	2,579	5,219
Basswood	731	1,366
Beech	1,744	4,542
Yellow birch	--	--
Hard maple	4,034	7,251
Soft maple	2,290	3,826
Elm	8,228	7,994
Black ash	55	--
White & green ash	6,196	9,132
Sycamore	1,767	4,563
Cottonwood	1,988	5,344
Willow	623	836
Hackberry	695	1,434
Bigtooth aspen	513	415
Quaking aspen	65	85
River birch	355	147
Sweetgum	761	1,257
Tupelo	321	570
Black cherry	2,338	3,279
Black walnut	1,026	1,100
Butternut	51	8
Yellow-poplar	2,206	4,012
Other hardwoods	4,532	3,274
Total hardwoods	58,597	99,281
All species	61,409	102,000

All table cells without observations in the inventory sample are indicated by --. Cells with observations smaller than the precision reported in the table are shown as zero. Columns and rows may not add to their totals due to rounding.

[1] Doyle rule.

Table 24. -- Average annual net growth and average annual removals of growing stock and sawtimber (International 1/4-inch rule) on timberland by ownership class and major species group, Indiana, 1986-1997

Ownership class	All species	Pine	Other softwoods	Soft hardwoods	Hard hardwoods
	Average net annual growth of growing stock				
		Major species group			
	(In thousand cubic feet)				
National forest	9,065	860	129	2,646	5,430
Other federal	7,331	63	27	3,221	4,020
State	12,142	725	152	3,486	7,779
County and municipal	401	--	--	128	273
Forest industry	726	--	--	309	417
Corporate	20,651	1,218	76	8,932	10,425
Individual	176,011	3,572	1,963	72,596	97,881
All ownerships	226,327	6,438	2,346	91,318	126,225
	Average annual removals of growing stock				
		Major species group			
	(In thousand cubic feet)				
National forest	967	10	--	413	544
Other federal	3,337	--	--	1,039	2,298
State	1,639	--	--	736	904
County and municipal	53	--	--	--	53
Forest industry	970	--	--	274	696
Corporate	4,539	--	--	1,107	3,432
Individual	76,717	290	206	32,785	43,437
All ownerships	88,222	300	206	36,353	51,363
	Average net annual growth of sawtimber				
		Major species group			
	(In thousand board feet) [1]				
National forest	41,562	4,351	709	10,821	25,681
Other federal	32,785	364	210	13,156	19,055
State	54,158	3,906	196	14,648	35,408
County and municipal	1,551	--	--	377	1,173
Forest industry	3,709	--	--	1,373	2,337
Corporate	82,030	5,889	8	30,684	45,449
Individual	727,086	19,289	4,967	280,893	421,937
All ownerships	942,881	33,799	6,090	351,952	551,040
	Average annual removals of sawtimber				
		Major species group			
	(In thousand board feet) [1]				
National forest	4,067	50	--	1,938	2,079
Other federal	13,085	--	--	4,847	8,238
State	6,738	--	--	2,903	3,836
County and municipal	--	--	--	--	--
Forest industry	4,393	--	--	1,348	3,045
Corporate	19,313	--	--	4,948	14,365
Individual	328,024	543	379	142,686	184,415
All ownerships	375,619	593	379	158,670	215,978

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[1] International 1/4-inch rule.

Table 24A. -- Average annual net growth and average annual removals of growing stock and sawtimber (Doyle rule) on timberland by ownership class and major species group, Indiana, 1986-1997

Ownership class	All species	Pine	Other softwoods	Soft hardwoods	Hard hardwoods
	Average net annual growth of growing stock				
		Major species group			
	(In thousand cubic feet)				
National forest	9,065	860	129	2,646	5,430
Other federal	7,331	63	27	3,221	4,020
State	12,142	725	152	3,486	7,779
County and municipal	401	--	--	128	273
Forest industry	726	--	--	309	417
Corporate	20,651	1,218	76	8,932	10,425
Individual	176,011	3,572	1,963	72,596	97,881
All ownerships	226,327	6,438	2,346	91,318	126,225
	Average annual removals of growing stock				
		Major species group			
	(In thousand cubic feet)				
National forest	967	10	--	413	544
Other federal	3,337	--	--	1,039	2,298
State	1,639	--	--	736	904
County and municipal	53	--	--	--	53
Forest industry	970	--	--	274	696
Corporate	4,539	--	--	1,107	3,432
Individual	76,717	290	206	32,785	43,437
All ownerships	88,222	300	206	36,353	51,363
	Average net annual growth of sawtimber				
		Major species group			
	(In thousand board feet) [1]				
National forest	22,466	1,987	296	6,122	14,061
Other federal	18,061	180	84	7,355	10,442
State	30,352	1,785	93	8,600	19,875
County and municipal	826	--	--	195	631
Forest industry	2,133	--	--	749	1,385
Corporate	47,544	2,718	6	17,136	27,684
Individual	411,633	8,203	2,121	164,367	236,943
All ownerships	533,016	14,872	2,599	204,525	311,020
	Average annual removals of sawtimber				
		Major species group			
	(In thousand board feet) [1]				
National forest	2,474	24	--	1,015	1,434
Other federal	8,360	--	--	3,256	5,104
State	4,551	--	--	2,031	2,520
County and municipal	--	--	--	--	--
Forest industry	2,920	--	--	891	2,029
Corporate	12,742	--	--	3,510	9,232
Individual	223,516	232	179	97,411	125,694
All ownerships	254,563	256	179	108,113	146,015

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[1] Doyle rule.

Table 25. -- Average annual net growth and average annual removals of growing stock and sawtimber (International 1/4-inch rule) on timberland by forest type group/local type and major species group, Indiana, 1986-1997

Forest type group/ local type	Average net annual growth of growing stock					Average annual removals of growing stock				
		Major species group					Major species group			
	All species	Pine	Other softwoods	Soft hardwoods	Hard hardwoods	All species	Pine	Other softwoods	Soft hardwoods	Hard hardwoods
	(In thousand cubic feet)					(In thousand cubic feet)				
Softwood type groups										
White-red-jack pine										
White pine	1,866	1,344	--	303	220	303	48	--	--	254
Loblolly-shortleaf pine										
Shortleaf-Virginia pine	2,855	1,959	29	562	305	90	41	--	--	50
Oak-pine										
Eastern redcedar	777	--	400	139	237	27	--	--	--	27
Eastern redcedar-hardwood	2,872	326	754	722	1,070	1,001	--	--	438	563
Oak-pine	3,947	1,832	45	1,425	645	--	--	--	--	--
Total	7,596	2,158	1,200	2,286	1,953	1,027	--	--	438	590
All softwood types	12,582	5,492	1,229	3,249	2,612	4,238	--	--	1,556	2,403
Hardwood type groups										
Oak-hickory										
Oak-hickory	78,634	593	458	18,895	58,688	22,956	--	--	6,786	16,171
Oak-gum-cypress										
Oak-gum-cypress	3,507	--	--	1,845	1,663	566	--	--	256	310
Elm-ash-cottonwood										
Elm-ash-cottonwood	36,756	22	413	26,618	9,701	8,355	--	--	5,664	2,692
Maple-beech-birch										
Maple-beech	77,379	283	215	31,174	45,706	32,261	--	183	14,132	17,946
Cherry-ash-yellow poplar	14,843	32	26	8,277	6,508	2,159	--	--	566	1,593
Total	92,222	316	241	39,450	52,214	34,420	--	183	14,698	19,539
Aspen-birch										
Aspen-birch	204	--	--	170	33	--	--	--	--	--
All hardwood types	211,323	931	1,112	86,979	122,300	66,298	--	183	27,403	38,712
Nonstocked	320	10	--	89	222	197	--	--	35	163
All forest types	226,327	6,438	2,346	91,318	126,225	88,222	300	206	36,353	51,363

Forest type group/ local type	Average net annual growth of sawtimber					Average annual removals of sawtimber				
		Major species group					Major species group			
	All species	Pine	Other softwoods	Soft hardwoods	Hard hardwoods	All species	Pine	Other softwoods	Soft hardwoods	Hard hardwoods
	(In thousand board feet) [1]					(In thousand board feet) [1]				
Softwood type groups										
White-red-jack pine										
White pine	10,641	8,766	--	1,178	697	1,210	--	--	--	1,210
Loblolly-shortleaf pine										
Shortleaf-Virginia pine	12,481	9,637	108	1,890	846	292	50	--	--	242
Oak-pine										
Eastern redcedar	1,270	--	296	374	600	132	--	--	--	132
Eastern redcedar-hardwood	10,143	1,220	2,139	2,286	4,498	4,878	--	--	2,296	2,582
Oak-pine	17,284	9,069	197	5,331	2,688	--	--	--	--	--
Total	28,697	10,289	2,632	7,990	7,785	5,010	--	--	2,296	2,715
All softwood types	52,600	28,740	2,740	11,355	9,766	16,287	493	--	6,058	9,736
Hardwood type groups										
Oak-hickory										
Oak-hickory	346,426	3,170	1,128	72,414	269,713	102,295	--	--	31,492	70,802
Oak-gum-cypress										
Oak-gum-cypress	15,065	--	--	7,698	7,367	2,640	--	--	1,182	1,458
Elm-ash-cottonwood										
Elm-ash-cottonwood	141,564	566	1,454	101,547	37,997	37,818	--	--	25,733	12,085
Maple-beech-birch										
Maple-beech	326,693	1,189	755	124,279	200,470	147,268	--	379	65,880	81,008
Cherry-ash-yellow poplar	52,432	65	12	30,863	21,492	6,934	--	--	2,134	4,801
Total	379,125	1,254	767	155,142	221,961	154,202	--	379	68,014	85,809
Aspen-birch										
Aspen-birch	733	--	--	513	221	--	--	--	--	--
All hardwood types	882,913	4,990	3,350	337,314	537,259	296,954	--	379	126,421	170,154
Nonstocked	1,386	46	--	373	967	993	--	--	174	819
All forest types	942,881	33,799	6,090	351,952	551,040	375,619	593	379	158,670	215,978

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[1] International 1/4-inch rule.

Table 25A. -- Average annual net growth and average annual removals of growing stock and sawtimber (Doyle rule) on timberland by forest type group/local type and major species group, Indiana, 1986-1997

Forest type group/ local type	Average net annual growth of growing stock					Average annual removals of growing stock				
		Major species group					Major species group			
	All species	Pine	Other softwoods	Soft hardwoods	Hard hardwoods	All species	Pine	Other softwoods	Soft hardwoods	Hard hardwoods
	(In thousand cubic feet)					(In thousand cubic feet)				
Softwood type groups										
White-red-jack pine										
White pine	1,866	1,344	--	303	220	303	48	--	--	254
Loblolly-shortleaf pine										
Shortleaf-Virginia pine	2,855	1,959	29	562	305	90	41	--	--	50
Oak-pine										
Eastern redcedar	777	--	400	139	237	27	--	--	--	27
Eastern redcedar-hardwood	2,872	326	754	722	1,070	1,001	--	--	438	563
Oak-pine	3,947	1,832	45	1,425	645	--	--	--	--	--
Total	7,596	2,158	1,200	2,286	1,953	1,027	--	--	438	590
All softwood types	12,582	5,492	1,229	3,249	2,612	4,238	--	--	1,556	2,403
Hardwood type groups										
Oak-hickory										
Oak-hickory	78,634	593	458	18,895	58,688	22,956	--	--	6,786	16,171
Oak-gum-cypress										
Oak-gum-cypress	3,507	--	--	1,845	1,663	566	--	--	256	310
Elm-ash-cottonwood										
Elm-ash-cottonwood	36,756	22	413	26,618	9,701	8,355	--	--	5,664	2,692
Maple-beech-birch										
Maple-beech	77,379	283	215	31,174	45,706	32,261	--	183	14,132	17,946
Cherry-ash-yellow poplar	14,843	32	26	8,277	6,508	2,159	--	--	566	1,593
Total	92,222	316	241	39,450	52,214	34,420	--	183	14,698	19,539
Aspen-birch										
Aspen-birch	204	--	--	170	33	--	--	--	--	--
All hardwood types	211,323	931	1,112	86,979	122,300	66,298	--	183	27,403	38,712
Nonstocked	320	10	--	89	222	197	--	--	35	163
All forest types	226,327	6,438	2,346	91,318	126,225	88,222	300	206	36,353	51,363

Forest type group/ local type	Average net annual growth of sawtimber					Average annual removals of sawtimber				
		Major species group					Major species group			
	All species	Pine	Other softwoods	Soft hardwoods	Hard hardwoods	All species	Pine	Other softwoods	Soft hardwoods	Hard hardwoods
	(In thousand board feet) [1]					(In thousand board feet) [1]				
Softwood type groups										
White-red-jack pine										
White pine	5,031	4,002	--	691	338	763	--	--	--	763
Loblolly-shortleaf pine										
Shortleaf-Virginia pine	5,848	4,386	51	1,013	397	148	24	--	--	124
Oak-pine										
Eastern redcedar	577	--	112	189	275	55	--	--	--	55
Eastern redcedar-hardwood	4,915	498	823	1,348	2,246	3,372	--	--	1,581	1,791
Oak-pine	8,188	3,676	81	2,820	1,611	--	--	--	--	--
Total	13,680	4,174	1,016	4,357	4,132	3,427	--	--	1,581	1,846
All softwood types	24,981	12,583	1,067	6,231	5,099	10,096	221	--	3,839	6,036
Hardwood type groups										
Oak-hickory										
Oak-hickory	194,209	1,505	415	41,084	151,205	70,128	--	--	21,909	48,219
Oak-gum-cypress										
Oak-gum-cypress	9,346	--	--	4,280	5,066	1,594	--	--	656	938
Elm-ash-cottonwood										
Elm-ash-cottonwood	84,138	180	768	62,371	20,819	28,559	--	--	19,661	8,898
Maple-beech-birch										
Maple-beech	186,024	552	344	71,105	114,022	102,558	--	179	45,951	56,428
Cherry-ash-yellow poplar	29,910	27	4	17,493	12,385	3,900	--	--	1,199	2,701
Total	215,933	580	348	88,598	126,407	106,458	--	179	47,150	59,129
Aspen-birch										
Aspen-birch	367	--	--	267	100	--	--	--	--	--
All hardwood types	503,994	2,265	1,532	196,600	303,597	206,739	--	179	89,376	117,184
Nonstocked	822	16	--	231	575	611	--	--	73	538
All forest types	533,016	14,872	2,599	204,525	311,020	254,563	256	179	108,113	146,015

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[1] Doyle rule.

Table 26. -- All live aboveground tree biomass on timberland by ownership class, major species group, and tree biomass component, Indiana, 1998

(In green tons)

Ownership class and major species group	All components	Tree biomass component						
		All live 1-5 inch trees	Growing-stock trees			Non-growing-stock trees		
			Stumps	Boles	Tops and limbs	Stumps	Boles	Tops and limbs
National forest								
Pine	945	31	51	771	86	0	4	1
Other softwoods	169	19	10	93	26	2	16	4
Soft hardwoods	3,889	422	155	2,326	664	18	232	72
Hard hardwoods	11,122	711	535	7,231	2,017	33	473	122
Total	16,125	1,182	750	10,422	2,792	54	726	199
Other federal								
Pine	50	25	1	21	2	--	--	--
Other softwoods	57	3	2	21	6	2	18	5
Soft hardwoods	6,033	437	235	3,278	952	59	838	233
Hard hardwoods	9,477	370	459	6,244	1,774	35	459	136
Total	15,617	835	698	9,564	2,734	97	1,314	375
State								
Pine	930	3	52	794	89	4	43	5
Other softwoods	113	--	7	65	17	2	17	5
Soft hardwoods	5,590	445	239	3,316	950	37	468	135
Hard hardwoods	16,426	790	823	10,801	2,995	58	749	211
Total	23,119	1,239	1,122	14,975	4,050	100	1,277	356
County and municipal								
Pine	2	--	0	2	0	--	--	--
Soft hardwoods	305	49	13	161	48	3	22	8
Hard hardwoods	602	65	27	387	107	1	11	4
Total	909	114	41	550	156	4	33	12
Forest industry								
Soft hardwoods	619	105	23	364	99	2	19	7
Hard hardwoods	998	43	33	488	131	15	230	58
Total	1,617	148	57	852	230	17	248	65
Corporate								
Pine	1,180	15	69	960	109	2	22	3
Other softwoods	156	95	3	23	7	2	19	6
Soft hardwoods	11,882	1,225	505	6,562	1,948	102	1,181	359
Hard hardwoods	21,941	994	918	13,267	3,624	68	2,349	622
Total	35,158	2,329	1,495	20,811	5,688	274	3,571	990
Individual								
Pine	4,470	94	253	3,552	427	9	121	15
Other softwoods	2,705	682	127	1,129	337	33	310	87
Soft hardwoods	103,106	8,998	4,010	57,105	15,987	983	12,420	3,603
Hard hardwoods	181,775	10,262	7,880	108,268	30,441	1,310	18,668	4,946
Total	292,057	20,035	12,270	170,055	47,191	2,334	31,520	8,651
All ownerships								
Pine	7,636	168	426	6,099	714	15	191	24
Other softwoods	3,201	798	149	1,332	393	41	380	108
Soft hardwoods	131,423	11,681	5,180	73,113	20,646	1,204	15,181	4,418
Hard hardwoods	242,342	13,235	10,677	146,686	41,088	1,620	22,938	6,099
Total	384,602	25,881	16,432	227,230	62,842	2,880	38,689	10,648

All table cells without observations in the inventory sample are indicated by --. Cells with observations smaller than the precision reported in the table are shown as zero. Columns and rows may not add to their totals due to rounding.

Table 27. -- Area of land by land class, forest type group/local type, and Forest Survey Unit, Indiana, 1986 and 1998

(In thousand acres)

Land class and local type class	All Units		Lower Wabash Unit		Knobs Unit		Upland Flats Unit		Northern Unit	
	1986	1998	1986	1998	1986	1998	1986	1998	1986	1998
Forest land										
Timberland										
White pine	37.4	29.9	9.9	10.6	18.1	8.7	3.8	--	5.6	10.6
Shortleaf-Virginia pine	31.3	51.0	6.4	6.2	24.9	44.7	--	--	--	0.1
Eastern redcedar	17.5	37.4	--	--	15.5	24.3	2.0	13.2	--	--
Eastern redcedar-hardwood	85.3	79.8	--	2.5	46.1	35.8	39.2	41.5	--	--
Oak-pine	95.8	77.1	19.2	21.7	54.5	41.1	6.4	2.7	15.7	11.7
Oak-hickory	1,537.9	1,603.8	344.3	292.6	801.9	821.7	109.3	160.0	282.4	329.4
Oak-gum-cypress	67.8	42.7	18.4	14.5	25.1	7.8	12.3	1.4	12.0	19.1
Elm-ash-cottonwood	575.2	660.1	152.3	164.5	120.6	128.5	54.3	91.3	248.0	275.8
Maple-beech	1,611.1	1,393.9	277.1	253.2	559.2	537.0	292.1	216.7	482.7	387.0
Cherry-ash-yellow poplar	234.4	327.4	32.8	59.4	73.1	61.9	51.7	58.5	76.8	147.6
Aspen-birch	2.1	7.2	--	--	2.1	4.8	--	--	--	2.4
Nonstocked	--	32.0	--	13.1	--	1.0	--	1.1	--	16.8
Subtotal	4,295.8	4,342.3	860.4	838.3	1,741.1	1,717.3	571.1	586.2	1,123.2	1,200.5
Reserved forest land	139.0	159.1	15.1	21.2	61.9	61.0	33.1	20.3	28.9	56.6
Other forest land	--	--	--	--	--	--	--	--	--	--
All forest land	4,434.8	4,501.3	875.5	859.5	1,803.0	1,778.2	604.2	606.5	1,152.1	1,257.1
Nonforest land										
Nonforest with trees										
Cropland with trees	82.5	50.3	25.0	11.3	21.9	19.6	10.1	10.6	25.5	8.9
Improved pasture with trees	149.9	149.0	33.3	23.8	52.2	54.6	28.8	15.6	35.6	55.0
Wooded strips	111.7	76.6	31.3	30.8	28.0	18.2	14.3	4.8	38.1	22.8
Idle farmland with trees	24.4	29.3	4.1	7.1	13.8	9.7	2.1	2.7	4.4	9.9
Marsh with trees	12.1	12.3	--	0.5	1.9	2.6	--	--	10.2	9.1
Urban and other with trees	391.6	558.6	53.5	109.0	77.6	103.0	31.9	62.9	228.6	283.9
Windbreaks	40.2	83.7	12.1	17.9	15.2	26.1	1.7	5.4	11.2	34.3
Wooded pasture	120.0	31.5	24.4	10.6	35.0	4.4	29.4	13.3	31.2	3.1
Total	932.4	991.4	183.7	211.0	245.6	238.1	118.3	115.2	384.8	427.1
Nonforest without trees										
Cropland	13,858.1	13,809.0	2,029.9	2,045.3	1,305.4	1,303.6	596.5	597.6	9,926.3	9,862.5
Improved pasture	1,313.1	1,040.1	202.6	164.2	307.4	362.5	138.8	161.6	664.3	351.7
Idle farmland	213.0	424.9	31.4	71.0	91.9	93.6	35.7	32.3	54.0	228.1
Marsh	47.7	60.4	2.1	5.1	--	2.4	2.1	--	43.5	52.9
Other farm-farmstead	382.3	408.1	42.1	33.0	62.3	72.7	31.8	51.9	246.1	250.5
Urban and other	1,720.0	1,593.9	260.1	215.6	306.9	254.8	112.0	71.3	1,041.0	1,052.2
Noncensus water	100.7	128.2	31.1	32.7	25.6	34.6	5.0	2.7	39.0	58.2
Total	17,634.9	17,464.6	2,599.3	2,566.9	2,099.5	2,124.2	921.9	917.3	12,014.2	11,856.1
All nonforest land	18,567.3	18,456.0	2,783.0	2,777.9	2,345.1	2,362.4	1,040.2	1,032.5	12,399.0	12,283.2
Total land	23,002.1	22,957.4	3,658.5	3,637.5	4,148.1	4,140.6	1,644.4	1,639.0	13,551.1	13,540.3

All table cells without observations in the inventory sample are indicated by --. Cells with observations smaller than the precision reported in the table are shown as zero. Columns and rows may not add to their totals due to rounding.

Table 28. -- Area of timberland by Forest Survey Unit and county/county group, Indiana, 1986 and 1998

(In thousand acres)

Forest Survey Unit and county	1986	1998
Lower Wabash Unit		
Clay	44.3	42.1
Daviess, Knox	65.9	45.3
Gibson	36.0	43.3
Greene	133.2	128.8
Martin	130.9	130.5
Parke	84.7	93.5
Pike	79.4	67.5
Posey, Vanderburgh	56.7	52.5
Putnam	82.9	80.8
Sullivan	67.8	63.9
Vermillion	28.3	36.1
Vigo	50.3	53.9
Total	860.4	838.3
Knobs Unit		
Brown	144.2	136.9
Clark, Scott	127.2	132.8
Crawford	140.1	129.6
Dubois	67.6	77.2
Floyd,Harrison	159.0	145.1
Jackson	111.8	111.1
Lawrence	117.8	122.5
Monroe	109.9	121.8
Morgan	84.1	83.9
Orange	110.8	140.0
Owen	112.1	106.9
Perry	178.0	165.1
Spencer	53.1	50.1
Warrick	96.3	62.5
Washington	129.1	131.7
Total	1,741.1	1,717.3
Upland Flats Unit		
Dearborn	107.5	90.0
Fayette, Union	51.2	35.2
Franklin	91.0	105.3
Jefferson	91.0	88.9
Jennings	80.4	84.9
Ohio, Switzerland	78.0	100.1
Ripley	72.0	81.8
Total	571.1	586.2

(Table 28 continued on next page)

(Table 28 continued)

Forest Survey Unit and county	1986	1998
Northern Unit		
AdHuWe	54.9	59.1
Allen	56.2	41.3
Bartholomew	38.9	44.2
BeFoWa	54.8	70.8
BlDeGrMa	51.7	54.5
BoClHaTi	43.0	41.6
CaTiWh	68.9	76.1
CaHoMiWa	86.5	90.7
DeHeRuWa	73.0	84.7
De Kalb, Steuben	67.3	51.6
ElNoWh	111.7	87.9
Fulton, Marshall	42.9	45.7
HaHeJoMaSh	49.1	67.8
JaLaNe	29.8	51.3
Jay, Randolph	38.7	48.2
Kosciusko	35.2	42.1
La Grange	48.1	47.2
La Porte	37.0	59.5
Montgomery	35.3	32.6
Porter	33.2	29.1
PuStSt	67.0	74.3
Total	1,123.2	1,200.5
All counties	4,295.8	4,342.3

All table cells without observations in the inventory sample are indicated by --. Cells with observations smaller than the precision reported in the table are shown as zero. Columns and rows may not add to their totals due to rounding.
AdHuWe = Adams, Huntington and Wells Counties.
BeFoWa = Benton, Fountain and Warren Counties.
BlDeGrMa = Blackford, Delaware, Grant and Madison Counties.
BoClHaTi = Boone, Clinton, Hamilton and Tipton Counties.
CaTiWh = Carroll, Tippecanoe and White Counties.
CaHoMiWa = Cass, Howard, Miami and Wabash Counties.
DeHeRuWa = Decatur, Henry, Rush and Wayne Counties.
ElNoWh = Elkart, Noble and Whitley Counties.
HaHeJoMaSh = Hancock, Hendricks, Johnson, Marion and Shelby Counties.
JaLaNe = Jasper, Lake and Newton Counties.
PuStSt = Pulaski, St. Joseph and Starke Counties.

Table 29. -- Area of timberland by Forest Survey Unit and stand-size class, Indiana, 1986 and 1998

(In thousand acres)

Forest Survey Unit and stand-size class	1986	1998
Lower Wabash Unit		
Sawtimber	572.2	568.6
Poletimber	234.3	199.1
Sapling & Seedling	53.9	57.4
Nonstocked	- -	13.1
Total	860.4	838.3
Knobs Unit		
Sawtimber	1,111.2	1,271.3
Poletimber	522.4	365.2
Sapling & Seedling	107.5	79.8
Nonstocked	- -	1.0
Total	1,741.1	1,717.3
Upland Flats Unit		
Sawtimber	321.7	364.8
Poletimber	207.9	188.1
Sapling & Seedling	41.5	32.3
Nonstocked	- -	1.1
Total	571.1	586.2
Northern Unit		
Sawtimber	729.7	847.1
Poletimber	337.1	265.7
Sapling & Seedling	56.4	70.8
Nonstocked	- -	16.8
Total	1,123.2	1,200.5
All Units		
Sawtimber	2,734.8	3,051.9
Poletimber	1,301.7	1,018.2
Sapling & seedling	259.3	240.2
Nonstocked	- -	32.0
Total	4,295.8	4,342.3

All table cells without observations in the inventory sample are indicated by --. Cells with observations smaller than the precision reported in the table are shown as zero. Columns and rows may not add to their totals due to rounding.

Table 30. -- Area of timberland by Forest Survey Unit, stand-size class and ownership class, Indiana, 1998

(In thousand acres)

Forest Survey Unit and stand-size class	All ownerships	Ownership class							
		National forest	Other federal	State	County and municipal	Indian	Forest industry	Corporate	Individual
Lower Wabash Unit									
Sawtimber	568.6	7.1	40.4	29.0	--	--	8.4	78.7	405.0
Poletimber	199.1	--	18.6	8.4	--	--	1.5	40.3	130.3
Sapling & Seedling	57.4	1.1	--	2.7	--	--	--	16.3	37.3
Nonstocked	13.1	--	--	--	--	--	--	3.9	9.2
Total	838.3	8.2	59.1	40.1	--	--	9.9	139.2	581.8
Knobs Unit									
Sawtimber	1,271.3	135.2	49.0	142.8	8.5	--	7.6	76.7	851.5
Poletimber	365.2	21.8	5.6	16.2	--	--	--	28.9	292.8
Sapling & Seedling	79.8	4.2	7.5	2.8	--	--	--	6.2	59.1
Nonstocked	1.0	0.3	0.1	--	--	--	--	0.3	0.3
Total	1,717.3	161.5	62.1	161.8	8.5	--	7.6	112.1	1,203.8
Upland Flats Unit									
Sawtimber	364.8	--	23.4	5.7	--	--	--	17.6	318.1
Poletimber	188.1	--	11.4	3.1	--	--	--	10.5	163.0
Sapling & Seedling	32.3	--	4.9	--	--	--	--	2.9	24.5
Nonstocked	1.1	--	0.1	--	--	--	--	--	1.0
Total	586.2	--	39.7	8.8	--	--	--	31.0	506.6
Northern Unit									
Sawtimber	847.1	--	21.3	16.2	--	--	--	67.0	742.7
Poletimber	265.7	--	20.9	10.9	--	--	--	30.6	203.4
Sapling & Seedling	70.8	--	--	--	--	--	--	5.1	65.7
Nonstocked	16.8	--	0.2	--	4.2	--	--	0.2	12.2
Total	1,200.5	--	42.5	27.1	4.2	--	--	102.7	1,024.0
All Units									
Sawtimber	3,051.9	142.3	134.0	193.8	8.5	--	15.9	240.0	2,317.3
Poletimber	1,018.2	21.8	56.5	38.6	--	--	1.5	110.3	789.5
Sapling & Seedling	240.2	5.4	12.4	5.5	--	--	--	30.4	186.6
Nonstocked	32.0	0.3	0.4	--	4.2	--	--	4.4	22.8
Total	4,342.3	169.8	203.3	237.9	12.7	--	17.4	385.0	3,316.2

(Table 30 continued)

Forest Survey Unit, local type class and stand-size class	All ownerships	Ownership class							
		National forest	Other federal	State	County and municipal	Indian	Forest industry	Corporate	Individual
Lower Wabash Unit									
White pine									
Sawtimber	6.1	--	--	--	--	--	--	6.1	--
Poletimber	4.6	--	--	--	--	--	--	3.0	1.6
Total	10.6	--	--	--	--	--	--	9.1	1.6
Shortleaf-Virginia pine									
Sawtimber	4.4	--	--	--	--	--	--	--	4.4
Sapling & Seedling	1.8	--	--	--	--	--	--	--	1.8
Total	6.2	--	--	--	--	--	--	--	6.2
Eastern redcedar-hardwood									
Sapling & Seedling	2.5	--	--	--	--	--	--	--	2.5
Total	2.5	--	--	--	--	--	--	--	2.5
Oak-pine									
Sawtimber	7.6	--	--	--	--	--	--	3.8	3.8
Poletimber	13.2	--	--	5.4	--	--	--	3.8	4.1
Sapling & Seedling	0.9	--	--	--	--	--	--	--	0.9
Total	21.7	--	--	5.4	--	--	--	7.6	8.8
Oak-hickory									
Sawtimber	208.4	4.5	31.8	1.9	--	--	5.1	22.3	142.7
Poletimber	67.3	--	2.8	--	--	--	--	18.7	45.8
Sapling & Seedling	17.0	--	--	--	--	--	--	2.7	14.3
Total	292.6	4.5	34.7	1.9	--	--	5.1	43.7	202.8
Oak-gum-cypress									
Sawtimber	7.8	--	--	--	--	--	--	2.3	5.5
Poletimber	6.7	--	6.7	--	--	--	--	--	--
Total	14.5	--	6.7	--	--	--	--	2.3	5.5
Elm-ash-cottonwood									
Sawtimber	129.8	2.6	3.7	11.5	--	--	--	24.8	87.2
Poletimber	28.3	--	--	--	--	--	1.5	10.7	16.1
Sapling & Seedling	6.3	--	--	--	--	--	--	0.8	5.5
Total	164.5	2.6	3.7	11.5	--	--	1.5	36.3	108.9
Maple-beech									
Sawtimber	174.8	--	1.9	10.3	--	--	3.3	18.9	140.3
Poletimber	60.0	--	6.3	3.0	--	--	--	2.7	48.0
Sapling & Seedling	18.4	--	--	--	--	--	--	12.7	5.7
Total	253.2	--	8.2	13.3	--	--	3.3	34.4	194.0
Cherry-ash-yellow poplar									
Sawtimber	29.9	--	3.0	5.3	--	--	--	0.5	21.1
Poletimber	19.0	--	2.8	--	--	--	--	1.4	14.8
Sapling & Seedling	10.4	1.1	--	2.7	--	--	--	--	6.6
Total	59.4	1.1	5.9	8.0	--	--	--	1.9	42.5
Nonstocked	13.1	--	--	--	--	--	--	3.9	9.2
All types									
Sawtimber	568.6	7.1	40.4	29.0	--	--	8.4	78.7	405.0
Poletimber	199.1	--	18.6	8.4	--	--	1.5	40.3	130.3
Sapling & Seedling	57.4	1.1	--	2.7	--	--	--	16.3	37.3
Nonstocked	13.1	--	--	--	--	--	--	3.9	9.2
Total	838.3	8.2	59.1	40.1	--	--	9.9	139.2	581.8

(Table 30 continued on next page)

(Table 30 continued)

Forest Survey Unit, local type class and stand-size class	All ownerships	Ownership class							
		National forest	Other federal	State	County and municipal	Indian	Forest industry	Corporate	Individual
Knobs Unit									
White pine									
Sawtimber	5.5	2.6	--	1.5	--	--	--	1.4	--
Poletimber	3.1	0.2	--	--	--	--	--	--	3.0
Total	8.7	2.8	--	1.5	--	--	--	1.4	3.0
Shortleaf-Virginia pine									
Sawtimber	34.6	5.1	--	5.9	--	--	--	--	23.5
Poletimber	10.1	3.1	--	--	--	--	--	--	7.1
Total	44.7	8.2	--	5.9	--	--	--	--	30.6
Eastern redcedar									
Sawtimber	12.1	0.3	--	--	--	--	--	3.4	8.3
Poletimber	12.2	--	--	--	--	--	--	--	12.2
Total	24.3	0.3	--	--	--	--	--	3.4	20.5
Eastern redcedar-hardwood									
Sawtimber	18.5	4.3	2.3	0.8	1.1	--	--	--	9.8
Poletimber	16.7	--	--	--	--	--	--	3.3	13.4
Sapling & Seedling	0.7	--	--	--	--	--	--	--	0.7
Total	35.8	4.3	2.3	0.8	1.1	--	--	3.3	23.9
Oak-pine									
Sawtimber	22.3	3.2	1.4	3.4	--	--	--	--	14.4
Poletimber	6.6	1.7	--	0.7	--	--	--	--	4.3
Sapling & Seedling	12.2	--	--	--	--	--	--	6.2	6.0
Total	41.1	4.9	1.4	4.0	--	--	--	6.2	24.7
Oak-hickory									
Sawtimber	629.9	76.6	30.5	119.3	3.4	--	--	38.7	361.3
Poletimber	154.8	6.7	--	9.9	--	--	--	12.2	126.0
Sapling & Seedling	37.0	3.3	6.6	1.9	--	--	--	--	25.2
Total	821.7	86.6	37.1	131.1	3.4	--	--	51.0	512.5
Oak-gum-cypress									
Sawtimber	2.9	--	--	--	--	--	--	--	2.9
Poletimber	3.8	--	--	--	--	--	--	--	3.8
Sapling & Seedling	1.1	--	--	--	--	--	--	--	1.1
Total	7.8	--	--	--	--	--	--	--	7.8
Elm-ash-cottonwood									
Sawtimber	86.4	6.1	9.6	--	--	--	1.4	--	69.3
Poletimber	40.3	3.5	--	--	--	--	--	5.7	31.1
Sapling & Seedling	1.8	--	--	--	--	--	--	--	1.8
Total	128.5	9.6	9.6	--	--	--	1.4	5.7	102.2
Maple-beech									
Sawtimber	413.6	32.9	4.0	11.2	1.0	--	6.2	30.4	327.9
Poletimber	100.8	5.6	3.8	5.7	--	--	--	4.4	81.3
Sapling & Seedling	22.7	--	--	0.8	--	--	--	--	21.9
Total	537.0	38.5	7.8	17.7	1.0	--	6.2	34.8	431.1
Cherry-ash-yellow poplar									
Sawtimber	40.9	2.0	1.2	0.7	2.9	--	--	--	34.0
Poletimber	16.8	1.1	1.8	--	--	--	--	3.2	10.8
Sapling & Seedling	4.3	1.0	0.8	--	--	--	--	--	2.5
Total	61.9	4.0	3.8	0.7	2.9	--	--	3.2	47.3
Aspen-birch									
Sawtimber	4.8	2.0	--	--	--	--	--	2.8	--
Total	4.8	2.0	--	--	--	--	--	2.8	--
Nonstocked	1.0	0.3	0.1	--	--	--	--	0.3	0.3
All types									
Sawtimber	1,271.3	135.2	49.0	142.8	8.5	--	7.6	76.7	851.5
Poletimber	365.2	21.8	5.6	16.2	--	--	--	28.9	292.8
Sapling & Seedling	79.8	4.2	7.5	2.8	--	--	--	6.2	59.1
Nonstocked	1.0	0.3	0.1	--	--	--	--	0.3	0.3
Total	1,717.3	161.5	62.1	161.8	8.5	--	7.6	112.1	1,203.8

(Table 30 continued on next page)

(Table 30 continued)

Forest Survey Unit, local type class and stand-size class	All ownerships	Ownership class							
		National forest	Other federal	State	County and municipal	Indian	Forest industry	Corporate	Individual
Upland Flats Unit									
Eastern redcedar									
Sawtimber	6.2	--	--	--	--	--	--	--	6.2
Poletimber	7.0	--	--	--	--	--	--	--	7.0
Total	13.2	--	--	--	--	--	--	--	13.2
Eastern redcedar-hardwood									
Sawtimber	19.4	--	--	--	--	--	--	3.1	16.3
Poletimber	15.8	--	--	--	--	--	--	--	15.8
Sapling & Seedling	6.3	--	--	--	--	--	--	--	6.3
Total	41.5	--	--	--	--	--	--	3.1	38.4
Oak-pine									
Sawtimber	2.7	--	--	--	--	--	--	--	2.7
Total	2.7	--	--	--	--	--	--	--	2.7
Oak-hickory									
Sawtimber	95.0	--	6.1	2.7	--	--	--	3.8	82.4
Poletimber	53.6	--	--	0.5	--	--	--	3.4	49.7
Sapling & Seedling	11.4	--	4.9	--	--	--	--	--	6.5
Total	160.0	--	11.0	3.2	--	--	--	7.2	138.5
Oak-gum-cypress									
Poletimber	1.4	--	--	--	--	--	--	--	1.4
Total	1.4	--	--	--	--	--	--	--	1.4
Elm-ash-cottonwood									
Sawtimber	63.0	--	7.8	--	--	--	--	--	55.2
Poletimber	20.0	--	0.8	--	--	--	--	3.1	16.1
Sapling & Seedling	8.3	--	--	--	--	--	--	2.9	5.4
Total	91.3	--	8.6	--	--	--	--	5.9	76.8
Maple-beech									
Sawtimber	141.8	--	9.4	3.1	--	--	--	10.7	118.7
Poletimber	68.5	--	10.6	2.6	--	--	--	2.8	52.4
Sapling & Seedling	6.4	--	--	--	--	--	--	--	6.4
Total	216.7	--	20.1	5.6	--	--	--	13.5	177.4
Cherry-ash-yellow poplar									
Sawtimber	36.7	--	--	--	--	--	--	--	36.7
Poletimber	21.7	--	--	--	--	--	--	1.2	20.5
Total	58.5	--	--	--	--	--	--	1.2	57.2
Nonstocked	1.1	--	0.1	--	--	--	--	--	1.0
All types									
Sawtimber	364.8	--	23.4	5.7	--	--	--	17.6	318.1
Poletimber	188.1	--	11.4	3.1	--	--	--	10.5	163.0
Sapling & Seedling	32.3	--	4.9	--	--	--	--	2.9	24.5
Nonstocked	1.1	--	0.1	--	--	--	--	--	1.0
Total	586.2	--	39.7	8.8	--	--	--	31.0	506.6

(Table 30 continued on next page)

(Table 30 continued)

Forest Survey Unit, local type class and stand-size class	All ownerships	Ownership class							
		National forest	Other federal	State	County and municipal	Indian	Forest industry	Corporate	Individual
Northern Unit									
White pine									
Sawtimber	10.6	--	--	--	--	--	--	--	10.6
Total	10.6	--	--	--	--	--	--	--	10.6
Shortleaf-Virginia pine									
Sawtimber	0.1	--	--	--	--	--	--	--	0.1
Total	0.1	--	--	--	--	--	--	--	0.1
Oak-pine									
Sawtimber	3.7	--	--	--	--	--	--	--	3.7
Poletimber	8.0	--	--	--	--	--	--	--	8.0
Total	11.7	--	--	--	--	--	--	--	11.7
Oak-hickory									
Sawtimber	262.4	--	10.3	8.5	--	--	--	24.5	219.2
Poletimber	63.6	--	4.7	4.2	--	--	--	4.1	50.6
Sapling & Seedling	3.4	--	--	--	--	--	--	--	3.4
Total	329.4	--	15.0	12.6	--	--	--	28.6	273.2
Oak-gum-cypress									
Sawtimber	19.1	--	3.3	--	--	--	--	3.5	12.2
Total	19.1	--	3.3	--	--	--	--	3.5	12.2
Elm-ash-cottonwood									
Sawtimber	188.3	--	3.1	4.4	--	--	--	7.3	173.4
Poletimber	68.0	--	4.4	3.4	--	--	--	4.5	55.7
Sapling & Seedling	19.6	--	--	--	--	--	--	5.1	14.5
Total	275.8	--	7.5	7.9	--	--	--	16.9	243.6
Maple-beech									
Sawtimber	294.3	--	--	--	--	--	--	27.3	267.0
Poletimber	66.5	--	9.4	--	--	--	--	7.9	49.2
Sapling & Seedling	26.1	--	--	--	--	--	--	--	26.1
Total	387.0	--	9.4	--	--	--	--	35.3	342.4
Cherry-ash-yellow poplar									
Sawtimber	66.3	--	4.6	3.3	--	--	--	4.3	54.1
Poletimber	59.7	--	2.5	3.3	--	--	--	14.0	39.9
Sapling & Seedling	21.6	--	--	--	--	--	--	--	21.6
Total	147.6	--	7.1	6.7	--	--	--	18.3	115.6
Nonstocked	16.8	--	0.2	--	4.2	--	--	0.2	12.2
All types									
Sawtimber	847.1	--	21.3	16.2	--	--	--	67.0	742.7
Poletimber	265.7	--	20.9	10.9	--	--	--	30.6	203.4
Sapling & Seedling	70.8	--	--	--	--	--	--	5.1	65.7
Nonstocked	16.8	--	0.2	--	4.2	--	--	0.2	12.2
Total	1,200.5	--	42.5	27.1	4.2	--	--	102.7	1,024.0

All table cells without observations in the inventory sample are indicated by --. Cells with observations smaller than the precision reported in the table are shown as zero. Columns and rows may not add to their totals due to rounding.

Table 31. -- Area of timberland by forest type group/local type, stand-size class, and potential productivity class, Indiana, 1998

(In thousand acres)

Forest type group/local type and stand-size class	All classes	Potential productivity class (cubic feet of growth per acre per year)					
		225+	165-224	120-164	85-119	50-84	20-49
White pine							
Sawtimber	22.2	6.3	2.3	12.1	1.5	--	--
Poletimber	7.7	0.2	1.7	5.9	--	--	--
Total	29.9	6.4	3.9	18.0	1.5	--	--
Shortleaf-Virginia pine							
Sawtimber	39.1	1.6	0.7	30.6	2.6	3.6	--
Poletimber	10.1	--	--	10.1	--	--	--
Sapling & Seedling	1.8	--	--	1.8	--	--	--
Total	51.0	1.6	0.7	42.5	2.6	3.6	--
Eastern redcedar							
Sawtimber	18.2	--	--	--	2.5	9.4	6.2
Poletimber	19.2	--	--	6.6	5.6	--	7.0
Total	37.4	--	--	6.6	8.1	9.4	13.3
Eastern redcedar-hardwood							
Sawtimber	37.8	--	3.6	8.1	15.7	1.1	9.4
Poletimber	32.5	--	--	3.5	24.9	4.1	--
Sapling & Seedling	9.5	--	--	2.5	5.0	1.2	0.7
Total	79.8	--	3.6	14.1	45.7	6.5	10.0
Oak-pine							
Sawtimber	36.2	12.1	--	10.7	8.6	4.9	--
Poletimber	27.9	10.1	--	13.7	1.5	2.6	--
Sapling & Seedling	13.1	3.3	--	0.9	6.3	2.5	--
Total	77.1	25.5	--	25.3	16.3	10.1	--
Oak-hickory							
Sawtimber	1,195.7	24.8	11.9	182.8	412.6	402.0	161.6
Poletimber	339.3	16.6	15.5	63.2	106.0	108.9	29.1
Sapling & Seedling	68.8	--	--	21.2	35.8	3.4	8.4
Total	1,603.8	41.4	27.4	267.2	554.3	514.3	199.2
Oak-gum-cypress							
Sawtimber	29.7	1.7	3.2	7.6	17.3	--	--
Poletimber	11.8	--	--	--	5.2	6.7	--
Sapling & Seedling	1.1	--	--	--	1.1	--	--
Total	42.7	1.7	3.2	7.6	23.6	6.7	--
Elm-ash-cottonwood							
Sawtimber	467.5	1.3	4.4	106.9	209.5	116.5	29.0
Poletimber	156.6	--	--	45.6	55.0	48.1	7.9
Sapling & Seedling	36.0	--	--	5.4	13.2	13.6	3.8
Total	660.1	1.3	4.4	157.9	277.7	178.2	40.6
Maple-beech							
Sawtimber	1,024.5	2.4	1.0	271.6	391.5	269.5	88.5
Poletimber	295.8	--	2.5	55.7	102.9	92.2	42.6
Sapling & Seedling	73.6	--	2.6	10.0	33.1	25.5	2.4
Total	1,393.9	2.4	6.1	337.3	527.5	387.1	133.6
Cherry-ash-yellow poplar							
Sawtimber	173.8	7.2	0.9	42.2	86.3	30.4	6.8
Poletimber	117.2	0.9	--	18.6	60.8	25.5	11.4
Sapling & Seedling	36.4	0.6	--	1.8	14.5	19.4	--
Total	327.4	8.7	0.9	62.6	161.6	75.4	18.1
Aspen-birch							
Sawtimber	7.2	--	--	--	2.8	4.3	--
Total	7.2	--	--	--	2.8	4.3	--
Nonstocked	32.0	--	--	4.1	19.3	7.7	0.8
All forest types							
Sawtimber	3,051.9	57.3	27.9	672.5	109.1	841.8	301.5
Poletimber	1,018.2	27.7	19.6	222.9	361.9	288.1	98.0
Sapling & Seedling	240.2	3.9	2.6	43.6	109.1	65.7	15.3
Nonstocked	32.0	--	--	4.1	19.3	7.7	0.8
Total	4,342.3	89.0	50.2	943.1	1,641.2	1,203.2	415.6

All table cells without observations in the inventory sample are indicated by --. Cells with observations smaller than the precision reported in the table are shown as zero. Columns and rows may not add to their totals due to rounding.

Table 32. -- Area of timberland by forest type group/local type, stand-size class, and basal-area class, Indiana, 1998

(In thousand acres)

Forest type group/local type and stand-size class	All classes	Basal-area class (square feet per acre)													
		0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121-150	151-180	181+
White pine															
Sawtimber	22.2	--	--	--	--	1.0	2.3	--	--	--	--	3.8	5.5	5.3	4.3
Poletimber	7.7	--	--	--	--	1.6	--	--	4.7	--	--	--	--	1.3	0.2
Total	29.9	--	--	--	--	2.5	2.3	--	4.7	--	--	3.8	5.5	6.7	4.5
Shortleaf-Virginia pine															
Sawtimber	39.1	3.7	--	0.8	--	2.8	--	0.7	--	--	4.4	9.5	15.5	1.5	0.1
Poletimber	10.1	--	--	--	--	0.5	--	--	1.3	--	--	3.3	--	4.6	0.4
Sapling & Seedling	1.8	--	--	--	--	--	--	--	--	--	--	--	1.8	--	--
Total	51.0	3.7	--	0.8	--	3.3	--	0.7	1.3	--	4.4	12.8	17.3	6.1	0.5
Eastern redcedar															
Sawtimber	18.2	0.8	--	5.0	8.8	--	--	--	--	0.8	--	2.8	--	--	--
Poletimber	19.2	--	--	--	--	--	10.4	--	--	--	5.5	3.3	--	--	--
Total	37.4	0.8	--	5.0	8.8	--	10.4	--	--	0.8	5.5	6.1	--	--	--
Eastern redcedar-hardwood															
Sawtimber	37.8	2.0	--	--	--	3.5	0.8	4.5	3.9	4.6	9.6	4.3	3.4	--	1.2
Poletimber	32.5	--	3.1	--	--	3.3	2.0	3.1	3.3	--	0.6	15.4	--	--	1.7
Sapling & Seedling	9.5	--	0.7	--	--	2.5	--	--	2.8	--	0.7	2.9	--	--	--
Total	79.8	2.0	3.8	--	--	9.3	2.8	7.6	10.0	4.6	10.8	22.6	3.4	--	2.8
Oak-pine															
Sawtimber	36.2	2.5	2.7	--	--	--	--	1.4	--	3.4	3.8	14.2	5.0	2.1	1.2
Poletimber	27.9	--	--	--	--	--	--	4.6	4.1	--	2.6	8.5	3.4	4.6	--
Sapling & Seedling	13.1	--	--	--	3.4	--	0.9	--	--	2.9	--	2.5	3.3	--	--
Total	77.1	2.5	2.7	--	3.4	--	0.9	6.0	4.1	6.2	6.4	25.3	11.7	6.8	1.2
Oak-hickory															
Sawtimber	1,195.7	25.1	4.3	12.6	8.5	17.9	17.2	73.7	111.1	131.2	170.3	326.6	182.5	80.5	34.3
Poletimber	339.3	--	3.5	10.5	4.4	20.2	15.8	45.8	74.9	63.9	29.3	48.5	20.7	0.7	1.1
Sapling & Seedling	68.8	2.5	12.8	1.6	4.4	10.8	1.8	5.8	3.5	8.2	1.2	7.7	8.6	--	--
Total	1,603.8	27.6	20.7	24.7	17.3	48.8	34.8	125.3	189.5	203.2	200.9	382.8	211.7	81.1	35.3
Oak-gum-cypress															
Sawtimber	29.7	--	--	--	--	--	--	--	--	7.9	--	10.2	7.2	3.3	1.2
Poletimber	11.8	--	--	--	6.7	--	--	--	1.4	3.8	--	--	--	--	--
Sapling & Seedling	1.1	--	--	1.1	--	--	--	--	--	--	--	--	--	--	--
Total	42.7	--	--	1.1	6.7	--	--	--	1.4	11.7	--	10.2	7.2	3.3	1.2
Elm-ash-cottonwood															
Sawtimber	467.5	10.0	2.4	19.1	18.1	14.4	20.5	44.9	38.0	46.9	71.4	50.4	54.2	42.0	35.1
Poletimber	156.6	1.9	1.0	4.1	13.8	12.4	24.6	19.4	21.7	11.3	19.7	15.7	8.7	2.3	--
Sapling & Seedling	36.0	7.7	1.0	3.6	--	0.8	10.0	3.2	1.5	3.7	2.6	1.0	--	0.8	--
Total	660.1	19.7	4.5	26.7	31.9	27.7	55.1	67.6	61.1	61.9	93.7	67.1	62.9	45.1	35.1
Maple-beech															
Sawtimber	1,024.5	10.9	2.0	3.5	7.5	23.3	37.2	77.3	93.5	115.5	147.5	254.4	186.6	53.8	11.4
Poletimber	295.8	--	11.0	3.8	15.2	11.8	43.7	46.4	34.6	37.2	27.8	51.0	7.2	5.2	0.8
Sapling & Seedling	73.6	--	--	--	14.3	4.7	7.5	15.1	5.2	5.4	10.1	9.4	--	--	1.9
Total	1,393.9	10.9	12.9	7.3	37.0	39.8	88.5	138.8	133.3	158.2	185.5	314.7	193.8	59.0	14.2

(Table 32 continued on next page)

(Table 32 continued)

Forest type group/local type and stand-size class	All classes	Basal-area class (square feet per acre)													
		0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121-150	151-180	181+
Cherry-ash-yellow poplar															
Sawtimber	173.8	10.4	13.2	14.1	8.0	10.7	9.2	15.2	17.6	4.0	20.2	14.2	15.5	13.5	8.1
Poletimber	117.2	1.1	--	5.6	2.8	2.7	17.5	18.3	14.1	30.1	3.9	15.0	2.7	0.4	3.0
Sapling & Seedling	36.4	--	--	--	9.4	8.7	--	7.6	5.7	0.6	0.7	3.7	--	--	--
Total	327.4	11.4	13.2	19.7	20.2	22.2	26.7	41.1	37.3	34.7	24.9	32.9	18.1	13.9	11.1
Aspen-birch															
Sawtimber	7.2	2.0	--	--	--	2.4	--	--	--	--	--	--	2.8	--	--
Total	7.2	2.0	--	--	--	2.4	--	--	--	--	--	--	2.8	--	--
Nonstocked	32.0	32.0	--	--	--	--	--	--	--	--	--	--	--	--	--
All forest types															
Sawtimber	3,051.9	67.4	24.5	55.0	50.9	75.9	87.3	217.8	264.1	314.2	427.2	690.4	478.1	202.0	96.9
Poletimber	1,018.2	3.0	18.7	23.9	42.9	52.5	114.0	137.7	160.1	146.3	89.6	160.7	42.7	19.1	7.1
Sapling & Seedling	240.2	10.3	14.6	6.3	31.5	27.5	20.2	31.6	18.5	20.8	15.3	27.1	13.7	0.8	1.9
Nonstocked	32.0	32.0	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	4,342.3	112.6	57.8	85.3	125.3	155.9	221.5	387.1	442.7	481.3	532.1	878.3	534.5	221.9	105.9

All table cells without observations in the inventory sample are indicated by --. Cells with observations smaller than the precision reported in the table are shown as zero. Columns and rows may not add to their totals due to rounding.

Table 33. -- Net volume of growing stock on timberland by species group and Forest Survey Unit, Indiana, 1986 and 1998

(In thousand cubic feet)

	Forest Survey Unit									
	All Units		Lower Wabash Unit		Knobs Unit		Upland Flats Unit		Northern Unit	
Species group	1986	1998	1986	1998	1986	1998	1986	1998	1986	1998
Softwoods										
Jack pine	4,947	5,050	754	588	1,651	--	156	334	2,386	4,128
Red pine	7,741	12,037	2,097	2,459	1,520	4,756	532	86	3,593	4,736
White pine	47,238	72,958	10,645	18,727	19,936	31,339	6,480	--	10,177	22,892
Shortleaf pine	24,698	39,112	4,857	6,467	19,840	32,645	--	--	--	--
Virginia pine	51,876	90,051	9,376	10,201	41,324	76,672	857	1,828	319	1,350
Baldcypress	4,528	3,538	4,399	3,538	129	--	--	--	--	--
Eastern redcedar	32,172	49,543	1,163	465	21,548	31,401	9,110	16,802	351	875
Other softwoods	7,494	5,493	--	--	1,657	1,065	--	372	5,837	4,056
Total softwoods	180,695	277,782	33,291	42,445	107,605	177,879	17,136	19,423	22,663	38,036
Hardwoods										
Select white oak	612,522	783,239	111,536	129,054	326,937	413,739	55,041	77,502	119,008	162,944
Other white oak	107,927	141,495	1,973	1,811	102,961	135,221	172	--	2,820	4,463
Select red oak	300,723	391,761	60,151	74,834	125,816	161,338	34,153	45,986	80,603	109,603
Other red oak	489,868	620,742	114,798	133,063	250,719	313,737	30,172	34,909	94,180	139,034
Select hickory	249,763	290,579	62,344	52,810	95,769	113,391	22,512	22,136	69,137	102,241
Other hickory	292,768	418,623	71,914	86,785	136,158	188,315	35,554	64,288	49,143	79,234
Basswood	62,315	70,156	11,398	13,953	6,765	8,608	6,031	5,825	38,121	41,769
Beech	146,876	161,528	20,178	22,355	82,246	86,822	15,713	22,303	28,739	30,047
Yellow birch	242	--	--	--	--	--	--	--	242	--
Hard maple	466,199	665,556	70,877	115,893	233,057	319,615	49,412	80,110	112,853	149,939
Soft maple	239,340	346,423	73,236	99,562	72,611	105,901	19,761	37,158	73,732	103,802
Elm	167,170	163,020	34,052	38,470	38,371	31,975	13,112	15,385	81,635	77,191
Black ash	6,241	7,653	--	--	1,289	749	1,294	3,365	3,658	3,539
White & green ash	370,633	486,797	72,479	90,311	109,529	116,972	55,781	81,083	132,844	198,432
Sycamore	227,163	313,785	61,119	75,165	86,475	124,774	30,062	40,491	49,507	73,354
Cottonwood	127,038	178,932	39,188	56,476	16,441	23,320	8,651	13,365	62,758	85,771
Willow	12,053	14,099	5,298	4,972	737	265	447	--	5,571	8,862
Hackberry	50,951	79,780	7,543	16,873	14,544	14,879	6,811	8,373	22,054	39,655
Bigtooth aspen	31,123	35,779	2,099	3,436	16,973	20,585	5,762	6,453	6,290	5,305
Quaking aspen	812	4,116	100	1,062	329	--	--	--	383	3,054
River birch	11,853	22,311	6,632	15,788	5,121	5,810	--	713	100	--
Sweetgum	60,499	84,591	13,123	22,313	30,968	34,550	13,848	19,483	2,559	8,246
Tupelo	43,391	49,103	9,954	9,639	23,544	29,717	8,275	5,569	1,618	4,179
Black cherry	88,060	151,921	14,434	15,038	28,847	41,071	7,389	15,017	37,390	80,794
Black walnut	118,949	174,129	28,760	45,820	31,113	45,367	18,299	26,670	40,777	56,270
Butternut	3,048	2,390	429	580	381	973	167	465	2,072	372
Yellow-poplar	534,687	747,060	126,035	186,222	287,441	388,462	73,441	87,892	47,769	84,484
Other hardwoods	178,871	216,946	52,698	53,072	73,875	72,121	20,786	28,864	31,512	62,890
Total hardwoods	5,001,086	6,622,513	1,072,350	1,365,359	2,199,016	2,798,275	532,647	743,406	1,197,074	1,715,473
All species	5,182,195	6,900,295	1,105,834	1,407,803	2,306,728	2,976,154	549,782	762,829	1,219,852	1,753,509

All table cells without observations in the inventory sample are indicated by --. Cells with observations smaller than the precision reported in the table are shown as zero. Columns and rows may not add to their totals due to rounding.

Table 34. -- Net volume of sawtimber (International 1/4-inch rule) on timberland by species group and Forest Survey Unit, Indiana, 1986 and 1998

(In thousand board feet) [1]

	Forest Survey Unit									
	All Units		Lower Wabash Unit		Knobs Unit		Upland Flats Unit		Northern Unit	
Species group	1986	1998	1986	1998	1986	1998	1986	1998	1986	1998
Softwoods										
Jack pine	12,403	18,765	--	2,844	5,029	--	752	1,632	6,621	14,289
Red pine	10,686	36,417	2,636	7,992	1,930	13,244	1,886	--	4,234	15,181
White pine	141,131	296,188	40,374	82,317	52,130	116,548	19,418	--	29,210	97,323
Shortleaf pine	67,871	160,903	15,278	25,635	52,593	135,268	--	--	--	--
Virginia pine	177,122	346,543	16,926	22,555	157,343	312,037	2,853	5,227	--	6,723
Baldcypress	18,086	15,649	17,515	15,649	571	--	--	--	--	--
Eastern redcedar	66,731	120,276	4,500	674	48,696	77,002	13,137	37,932	398	4,668
Other softwoods	4,811	9,895	--	--	651	--	--	--	4,161	9,895
Total softwoods	498,840	1,004,636	97,229	157,666	318,941	654,100	38,047	44,791	44,623	148,080
Hardwoods										
Select white oak	2,407,612	3,229,557	452,237	530,253	1,268,682	1,719,718	211,498	314,274	475,195	665,312
Other white oak	458,871	651,284	5,317	7,283	438,933	621,401	896	--	13,725	22,601
Select red oak	1,275,774	1,699,636	258,500	315,073	525,384	712,671	153,013	202,902	338,876	468,991
Other red oak	2,013,831	2,648,745	477,199	552,639	1,037,340	1,366,056	130,189	158,708	369,102	571,343
Select hickory	810,320	1,038,553	208,277	194,550	321,366	417,995	68,628	68,619	212,048	357,389
Other hickory	967,254	1,636,003	249,062	345,520	453,320	750,379	113,327	247,612	151,546	292,493
Basswood	227,400	262,037	44,212	51,020	29,864	40,510	27,428	18,379	125,897	152,128
Beech	602,517	665,713	83,705	97,903	339,126	347,132	54,876	87,555	124,810	133,124
Hard maple	1,429,687	2,217,682	200,271	384,979	674,837	1,028,850	137,817	268,208	416,762	535,644
Soft maple	721,441	1,072,160	229,963	351,617	196,801	292,655	65,453	98,919	229,224	328,969
Elm	320,664	370,564	65,885	111,081	77,902	74,230	22,282	19,935	154,595	165,318
Black ash	15,284	18,559	--	--	776	1,151	3,095	8,969	11,414	8,439
White & green ash	1,166,461	1,736,046	216,602	319,734	343,048	413,312	165,586	294,392	441,225	708,609
Sycamore	897,881	1,318,720	232,993	289,882	332,220	522,745	127,770	178,531	204,898	327,562
Cottonwood	571,448	847,993	168,920	262,506	73,446	110,373	43,882	65,107	285,200	410,008
Willow	35,241	46,178	19,684	18,947	813	--	1,080	--	13,664	27,231
Hackberry	157,690	243,972	24,428	55,460	44,068	46,267	18,717	15,821	70,477	126,424
Bigtooth aspen	104,297	145,053	5,964	14,033	57,564	80,766	20,327	26,315	20,442	23,940
Quaking aspen	2,097	9,653	449	3,175	1,648	--	--	--	--	6,478
River birch	24,595	44,000	9,898	28,171	14,697	15,830	--	--	--	--
Sweetgum	194,090	272,332	37,117	65,425	102,357	119,350	47,306	57,194	7,310	30,363
Tupelo	124,777	132,410	21,804	30,281	67,022	70,623	29,741	19,464	6,211	12,042
Black cherry	237,686	424,466	34,112	40,058	88,645	133,725	23,492	43,858	91,437	206,825
Black walnut	387,913	639,339	97,934	189,978	103,974	177,947	43,479	83,024	142,525	188,390
Butternut	9,399	8,139	--	2,396	806	2,565	--	1,492	8,593	1,687
Yellow-poplar	2,325,741	3,359,811	546,780	836,342	1,233,174	1,737,951	334,032	387,172	211,754	398,346
Other hardwoods	318,565	504,060	103,852	137,712	109,274	134,024	27,321	44,294	78,118	188,030
Total hardwoods	17,808,536	25,242,665	3,795,166	5,236,014	7,937,090	10,938,223	1,871,234	2,710,743	4,205,047	6,357,685
All species	18,307,376	26,247,301	3,892,394	5,393,679	8,256,031	11,592,323	1,909,281	2,755,535	4,249,670	6,505,765

All table cells without observations in the inventory sample are indicated by --. Cells with observations smaller than the precision reported in the table are shown as zero. Columns and rows may not add to their totals due to rounding.

[1] International 1/4-inch rule.

Table 34A. -- Net volume of sawtimber (Doyle rule) on timberland by species group and Forest Survey Unit, Indiana, 1986 and 1998

(In thousand board feet) [1]

Species group	All Units		Forest Survey Unit: Lower Wabash Unit		Knobs Unit		Upland Flats Unit		Northern Unit	
	1986	1998	1986	1998	1986	1998	1986	1998	1986	1998
Softwoods										
Jack pine	5,251	8,727	--	983	2,195	--	360	978	2,696	6,767
Red pine	3,797	15,129	1,015	3,554	667	4,753	652	--	1,463	6,823
White pine	68,845	164,227	22,865	50,377	24,020	59,890	8,814	--	13,146	53,960
Shortleaf pine	29,368	82,820	6,820	12,587	22,548	70,233	--	--	--	--
Virginia pine	90,139	192,035	6,491	8,489	81,522	178,843	2,126	1,948	--	2,756
Baldcypress	10,195	11,140	9,997	11,140	197	--	--	--	--	--
Eastern redcedar	31,006	55,654	2,375	233	22,753	36,763	5,741	16,740	137	1,917
Other softwoods	1,870	3,764	--	--	225	--	--	--	1,645	3,764
Total softwoods	240,471	533,496	49,564	87,362	154,127	350,481	17,692	19,666	19,088	75,987
Hardwoods										
Select white oak	1,573,919	2,205,344	303,445	379,530	787,132	1,120,016	144,989	225,685	338,353	480,112
Other white oak	265,879	407,511	2,779	4,402	254,381	388,175	527	--	8,192	14,934
Select red oak	895,927	1,247,784	181,814	237,581	356,304	501,076	110,227	137,586	247,582	371,540
Other red oak	1,324,825	1,806,918	324,196	391,007	660,289	914,700	90,814	104,726	249,527	396,484
Select hickory	462,328	587,868	115,072	109,045	179,582	236,800	41,707	37,335	125,967	204,687
Other hickory	549,186	962,894	140,947	201,234	256,997	443,197	65,552	146,027	85,689	172,436
Basswood	143,418	169,829	27,558	36,816	18,224	27,261	17,980	11,786	79,655	93,966
Beech	413,851	458,728	53,701	62,796	230,083	234,826	39,538	63,625	90,528	97,481
Hard maple	856,772	1,360,253	114,224	237,934	384,430	596,187	77,375	159,644	280,742	366,488
Soft maple	469,659	713,840	148,959	245,063	122,452	180,685	40,497	76,156	157,750	211,936
Elm	176,629	217,579	35,076	68,821	44,076	39,095	12,045	9,432	85,433	100,232
Black ash	9,656	9,767	--	--	397	480	1,951	5,143	7,308	4,144
White & green ash	700,281	1,077,604	127,329	208,941	201,830	250,733	97,950	174,982	273,171	442,948
Sycamore	637,769	979,562	164,024	206,992	232,317	375,941	89,719	126,193	151,709	270,435
Cottonwood	442,027	730,346	127,507	209,655	57,271	103,548	38,711	64,090	218,538	353,053
Willow	21,388	27,675	12,297	10,625	584	--	635	--	7,871	17,050
Hackberry	94,054	149,874	14,091	37,281	26,901	29,359	9,665	7,859	43,397	75,375
Bigtooth aspen	56,485	84,099	3,243	8,455	31,662	46,649	11,146	16,489	10,435	12,506
Quaking aspen	1,377	5,995	351	2,642	1,025	--	--	--	--	3,352
River birch	14,381	22,606	5,958	13,826	8,423	8,780	--	--	--	--
Sweetgum	115,026	160,402	20,581	36,381	62,855	68,616	27,567	36,545	4,023	18,859
Tupelo	76,066	75,377	13,139	18,770	40,346	38,087	18,754	11,779	3,827	6,741
Black cherry	136,018	248,143	19,403	24,380	50,951	84,738	13,148	25,183	52,516	113,842
Black walnut	216,634	359,999	54,095	105,622	56,866	98,815	22,638	43,892	83,035	111,670
Butternut	5,417	4,025	--	1,226	474	1,313	--	623	4,943	863
Yellow-poplar	1,508,535	2,253,474	356,912	562,542	785,444	1,157,206	227,685	253,970	138,493	279,756
Other hardwoods	174,403	281,824	56,563	74,160	57,570	73,149	14,490	22,972	45,780	111,543
Total hardwoods	11,341,909	16,609,316	2,423,266	3,495,731	4,908,869	7,019,430	1,215,311	1,761,722	2,794,463	4,332,432
All species	11,582,380	17,142,812	2,472,830	3,583,093	5,062,996	7,369,911	1,233,003	1,781,388	2,813,551	4,408,419

All table cells without observations in the inventory sample are indicated by --. Cells with observations smaller than the precision reported in the table are shown as zero. Columns and rows may not add to their totals due to rounding.

[1] Doyle rule.

Table 35. -- Net volume of all live trees[1] greater than 5 inches in diameter at breast height on timberland by species group and diameter class, Indiana, 1998

(In thousand cubic feet)

Species group	All classes	Diameter class (inches at breast height) 5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
Softwoods											
Jack pine	5,473	148	1,106	2,040	718	1,461	--	--	--	--	--
Red pine	12,037	687	3,579	4,654	2,115	1,001	--	--	--	--	--
White pine	74,411	2,065	8,412	14,864	17,732	12,523	8,941	7,267	2,607	--	--
Shortleaf pine	40,112	1,593	5,849	9,183	11,256	6,995	3,827	449	960	--	--
Virginia pine	92,522	7,042	15,448	17,382	17,684	13,716	10,731	7,518	2,664	338	--
Baldcypress	3,581	50	122	94	378	620	615	734	968	--	--
Eastern redcedar	63,330	14,456	16,501	14,067	9,035	4,960	2,961	944	407	--	--
Other softwoods	5,698	797	2,702	1,662	537	--	--	--	--	--	--
Total softwoods	297,164	26,837	53,720	63,947	59,456	41,275	27,074	16,911	7,606	338	--
Hardwoods											
Select white oak	837,198	14,945	24,542	45,345	65,372	89,089	110,348	117,807	101,556	223,418	44,777
Other white oak	145,668	1,121	3,190	7,578	13,708	23,016	26,292	30,495	20,648	19,621	--
Select red oak	413,131	5,862	9,555	22,975	31,556	37,406	42,815	50,281	48,362	109,447	54,871
Other red oak	666,949	10,075	21,771	39,347	52,933	81,076	77,382	94,669	76,442	180,198	33,055
Select hickory	308,363	13,914	28,164	36,294	56,099	49,507	47,865	43,414	11,168	21,755	184
Other hickory	441,638	12,406	32,394	49,779	69,381	79,997	69,837	50,906	25,633	47,060	4,245
Basswood	84,879	5,130	5,784	8,214	8,091	8,185	15,491	5,373	6,753	17,296	4,561
Beech	253,840	5,853	9,925	13,668	11,943	20,376	22,987	33,370	27,637	73,969	34,112
Hard maple	767,602	53,689	75,716	87,247	96,449	102,405	92,320	76,075	63,287	105,464	14,951
Soft maple	447,129	26,620	41,399	48,115	45,727	49,938	48,032	41,137	37,371	88,008	20,782
Elm	197,609	30,102	37,422	32,169	27,784	19,364	17,422	6,665	5,136	21,544	--
Black ash	9,311	338	1,917	1,762	2,056	668	1,226	693	--	652	--
White & green ash	548,949	25,428	47,008	61,645	71,334	84,309	68,641	66,080	55,232	58,174	11,098
Sycamore	342,600	6,174	11,223	23,399	25,796	35,599	27,346	30,508	39,950	108,394	34,211
Cottonwood	184,011	767	2,873	6,561	7,310	8,628	18,700	6,957	5,785	72,995	53,433
Willow	22,971	1,168	2,558	3,905	2,502	3,392	4,028	2,521	2,555	344	--
Hackberry	93,627	7,478	12,458	10,533	10,515	10,383	11,294	9,532	4,976	16,006	452
Bigtooth aspen	36,354	996	2,380	3,723	4,918	6,251	7,936	5,821	3,040	1,288	--
Quaking aspen	4,187	674	485	927	568	--	758	--	--	775	--
River birch	23,511	3,007	4,465	5,709	4,002	2,668	2,551	--	1,110	--	--
Sweetgum	87,204	5,136	9,030	10,472	13,126	13,789	10,342	9,264	7,565	8,481	--
Tupelo	55,352	5,544	7,575	8,639	6,548	10,833	8,369	3,697	776	3,371	--
Black cherry	202,075	18,913	26,221	32,867	27,362	31,052	23,459	15,868	12,655	13,479	199
Black walnut	197,950	9,519	15,998	21,467	37,176	32,728	32,829	27,453	10,134	10,307	339
Butternut	3,576	357	425	502	618	1,454	220	--	--	--	--
Yellow-poplar	766,566	16,332	34,205	52,958	67,608	87,285	109,021	104,903	93,626	181,183	19,445
Other hardwoods	331,338	52,074	55,190	51,078	43,056	42,905	27,594	28,243	14,052	16,756	392
Total hardwoods	7,473,588	333,623	523,871	686,879	803,536	932,304	925,105	861,732	675,448	1,399,985	331,106
Noncommercial species	38,427	12,046	8,436	5,500	2,722	3,379	3,216	1,379	200	--	1,549
All species	7,809,180	360,460	577,591	750,827	862,992	973,579	952,179	878,643	683,054	1,400,323	331,106

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[1] Net volume of all live trees 5 inches d.b.h. and larger from a 1-foot stump to a 4-inch top diameter outside bark.

Table 36. -- Net volume (International 1/4-inch rule) of tree species on timberland by individual tree species and major tree class, Indiana, 1998

Individual species	All live	Major tree class: All live trees: Growing stock	All live trees: Short-log	All live trees: Rough	All live trees: Rotten	Saw-log size trees: Total saw-log size trees	Saw-log size trees: Sawtimber	Saw-log size trees: Short-log
Softwoods		(In thousand cubic feet)				(In thousand board feet) [1]		
Eastern redcedar	63,330	49,543	1,221	12,146	420	125,633	120,276	5,357
Tamarack	413	413	--	--	--	--	--	--
White spruce	88	88	--	--	--	--	--	--
Jack pine	5,473	5,050	270	153	--	19,816	18,765	1,050
Shortleaf pine	40,112	39,112	302	610	89	162,210	160,903	1,308
Red pine	12,037	12,037	--	--	--	36,417	36,417	--
Eastern white pine	74,411	72,958	--	1,452	--	296,188	296,188	--
Scotch pine	5,197	4,993	--	205	--	9,895	9,895	--
Virginia pine	92,522	90,051	1,361	892	217	351,457	346,543	4,914
Baldcypress	3,581	3,538	--	43	--	15,649	15,649	--
Total softwoods	297,164	277,782	3,154	15,501	727	1,017,265	1,004,636	12,629
Hardwoods								
Boxelder	44,044	17,132	2,134	19,481	5,297	44,103	38,071	6,032
Black maple	6,281	4,676	--	504	1,100	13,505	13,505	--
Red maple	263,880	207,872	18,160	29,007	8,842	635,138	589,601	45,537
Silver maple	183,333	138,636	18,319	20,291	6,087	529,070	482,559	46,511
Sugar maple	761,156	660,714	24,882	49,455	26,104	2,265,237	2,204,176	61,060
Ohio buckeye	13,677	9,059	833	1,913	1,873	27,427	25,089	2,338
River birch	23,511	22,311	498	510	192	45,392	44,000	1,392
Paper birch	237	237	--	--	--	1,099	1,099	--
Gray birch	25	25	--	--	--	--	--	--
Water hickory	848	848	--	--	--	4,243	4,243	--
Bitternut hickory	176,339	164,980	4,924	5,601	835	656,925	642,877	14,049
Pignut hickory	264,769	253,112	5,430	4,245	1,982	1,005,816	990,415	15,401
Pecan	2,039	1,764	--	275	--	7,001	7,001	--
Shellbark hickory	6,617	6,617	--	--	--	29,194	29,194	--
Shagbark hickory	259,675	243,970	6,544	8,399	761	871,461	855,283	16,179
Mockernut hickory	39,714	37,910	719	811	275	147,702	145,543	2,158
American chestnut	157	--	--	82	75	--	--	--
Northern catalpa	8,846	2,955	664	2,438	2,790	13,999	12,199	1,799
Hackberry	93,627	79,780	4,198	8,577	1,072	255,736	243,972	11,765
Flowering dogwood	7,755	3,490	--	4,063	201	--	--	--
Common persimmon	15,103	13,178	--	1,625	300	13,436	13,436	--
American beech	253,840	161,528	7,340	31,727	53,246	685,480	665,713	19,767
White ash	442,624	391,699	18,175	30,638	2,112	1,476,197	1,425,118	51,078
Black ash	3,628	2,893	--	42	693	4,463	4,463	--
Green ash	106,324	95,098	1,418	7,915	1,893	315,333	310,928	4,405
Blue ash	5,683	4,759	--	924	--	14,096	14,096	--
Honeylocust	43,506	34,134	762	7,482	1,128	107,450	105,291	2,159
Kentucky coffeetree	2,223	2,076	--	117	30	5,626	5,626	--
Butternut	3,576	2,390	--	896	290	8,139	8,139	--
Black walnut	197,950	174,129	5,913	13,867	4,043	660,418	639,339	21,079
Sweetgum	87,204	84,591	835	1,317	461	274,560	272,332	2,228
Yellow-poplar	766,566	747,060	4,110	7,352	8,044	3,369,824	3,359,811	10,014
White mulberry	564	200	--	364	--	--	--	--
Red mulberry	10,236	1,240	--	6,636	2,360	--	--	--
Water tupelo	100	100	--	--	--	--	--	--
Blackgum	56,898	50,649	1,201	4,171	877	143,557	140,149	3,408
Swamp tupelo	1,069	1,069	--	--	--	4,783	4,783	--
Sycamore	342,600	313,785	6,096	12,084	10,635	1,332,992	1,318,720	14,272
Eastern cottonwood	184,011	178,932	748	2,606	1,725	849,828	847,993	1,835
Bigtooth aspen	36,640	36,066	--	575	--	145,053	145,053	--
Swamp cottonwood	279	279	--	--	--	1,322	1,322	--
Quaking aspen	3,900	3,830	--	71	--	9,653	9,653	--

(Table 36 continued on next page)

(Table 36 continued)

Individual species	All live	Major tree class						
		All live trees				Saw-log size trees		
		Growing stock	Short-log	Rough	Rotten	Total saw-log size trees	Sawtimber	Short-log
		(In thousand cubic feet)				(In thousand board feet) [1]		
Hardwoods								
Black cherry	202,075	151,921	11,191	35,565	3,397	455,706	424,466	31,240
White oak	694,543	651,191	18,568	17,140	7,643	2,752,031	2,705,360	46,672
Swamp white oak	37,592	36,844	336	284	128	156,877	155,867	1,010
Scarlet oak	35,544	34,939	265	44	296	152,559	151,833	726
Northern pin oak	15,618	13,785	--	774	1,059	62,872	62,872	--
Southern red oak	513	513	--	--	--	2,527	2,527	--
Cherrybark;swamp red oak	1,444	1,444	--	--	--	6,486	6,486	--
Shingle oak	24,547	21,543	2,038	965	--	79,994	75,317	4,677
Bur oak	18,121	15,291	2,251	579	--	70,680	65,091	5,589
Blackjack oak	320	320	--	--	--	--	--	--
Swamp chestnut oak	189	189	--	--	--	--	--	--
Chinkapin oak	86,753	79,724	3,260	3,435	334	312,527	303,240	9,287
Pin oak	98,035	94,796	235	1,804	1,199	391,306	390,658	648
Chestnut oak	136,053	131,978	1,099	2,098	877	615,616	612,106	3,510
Northern red oak	401,720	380,739	10,420	8,859	1,701	1,676,334	1,649,172	27,162
Shumard oak	10,179	9,767	412	--	--	44,947	43,978	969
Post oak	9,615	9,517	--	72	26	39,178	39,178	--
Black oak	490,514	453,010	13,019	18,424	6,061	1,989,730	1,957,799	31,931
Black locust	54,155	35,125	1,982	10,888	6,160	101,866	96,440	5,426
Black willow	22,971	14,099	1,634	6,901	337	49,987	46,178	3,809
Sassafras	129,461	96,745	3,455	20,560	8,701	209,865	200,705	9,160
American basswood	84,879	70,156	3,660	4,441	6,623	271,617	262,037	9,580
Winged elm	568	568	--	--	--	--	--	--
American elm	112,426	85,150	5,945	20,542	789	189,409	170,344	19,065
Siberian elm	353	--	327	26	--	1,062	--	1,062
Slippery elm	84,060	77,100	782	6,058	120	202,862	200,219	2,643
Rock elm	283	283	--	--	--	--	--	--
Total hardwoods	7,473,588	6,622,513	214,783	445,520	190,773	25,811,296	25,242,665	568,631
Total commercial species	7,771,077	6,900,295	217,937	461,021	191,500	26,828,562	26,247,301	581,260
Noncommercial species	38,427	--	--	36,930	1,497	--	--	--
Total all species	7,809,180	6,900,295	217,937	497,951	192,997	26,828,562	26,247,301	581,260

All table cells without observations in the inventory sample are indicated by --. Cells with observations smaller than the precision reported in the table are shown as zero. Columns and rows may not add to their totals due to rounding.

[1] International 1/4-inch rule.

Table 36A. -- Net volume (Doyle rule) of tree species on timberland by individual tree species and major tree class, Indiana, 1998

Individual species	All live	Major tree class: All live trees: Growing stock	All live trees: Short-log	All live trees: Rough	All live trees: Rotten	Saw-log size trees: Total saw-log size trees	Saw-log size trees: Sawtimber	Saw-log size trees: Short-log
		(In thousand cubic feet)				(In thousand board feet) [1]		
Softwoods								
Eastern redcedar	63,330	49,543	1,221	12,146	420	57,765	55,654	2,111
Tamarack	413	413	--	--	--	--	--	--
White spruce	88	88	--	--	--	--	--	--
Jack pine	5,473	5,050	270	153	--	9,090	8,727	363
Shortleaf pine	40,112	39,112	302	610	89	83,272	82,820	452
Red pine	12,037	12,037	--	--	--	15,129	15,129	--
Eastern white pine	74,411	72,958	--	1,452	--	164,227	164,227	--
Scotch pine	5,197	4,993	--	205	--	3,764	3,764	--
Virginia pine	92,522	90,051	1,361	892	217	194,689	192,035	2,654
Baldcypress	3,581	3,538	--	43	--	11,140	11,140	--
Total softwoods	297,164	277,782	3,154	15,501	727	539,076	533,496	5,580
Hardwoods								
Boxelder	44,044	17,132	2,134	19,481	5,297	24,183	21,184	2,999
Black maple	6,281	4,676	--	504	1,100	8,223	8,223	--
Red maple	263,880	207,872	18,160	29,007	8,842	416,460	383,932	32,528
Silver maple	183,333	138,636	18,319	20,291	6,087	366,083	329,907	36,175
Sugar maple	761,156	660,714	24,882	49,455	26,104	1,392,997	1,352,030	40,967
Ohio buckeye	13,677	9,059	833	1,913	1,873	17,935	16,649	1,286
River birch	23,511	22,311	498	510	192	23,425	22,606	819
Paper birch	237	237	--	--	--	459	459	--
Gray birch	25	25	--	--	--	--	--	--
Water hickory	848	848	--	--	--	2,228	2,228	--
Bitternut hickory	176,339	164,980	4,924	5,601	835	393,433	384,330	9,103
Pignut hickory	264,769	253,112	5,430	4,245	1,982	586,619	576,975	9,644
Pecan	2,039	1,764	--	275	--	4,995	4,995	--
Shellbark hickory	6,617	6,617	--	--	--	18,911	18,911	--
Shagbark hickory	259,675	243,970	6,544	8,399	761	489,189	478,751	10,438
Mockernut hickory	39,714	37,910	719	811	275	85,571	84,572	1,000
American chestnut	157	--	--	82	75	--	--	--
Northern catalpa	8,846	2,955	664	2,438	2,790	8,655	7,473	1,182
Hackberry	93,627	79,780	4,198	8,577	1,072	159,086	149,874	9,212
Flowering dogwood	7,755	3,490	--	4,063	201	--	--	--
Common persimmon	15,103	13,178	--	1,625	300	6,383	6,383	--
American beech	253,840	161,528	7,340	31,727	53,246	473,067	458,728	14,339
White ash	442,624	391,699	18,175	30,638	2,112	917,740	883,235	34,505
Black ash	3,628	2,893	--	42	693	1,962	1,962	--
Green ash	106,324	95,098	1,418	7,915	1,893	196,798	194,369	2,429
Blue ash	5,683	4,759	--	924	--	7,805	7,805	--
Honeylocust	43,506	34,134	762	7,482	1,128	65,189	64,158	1,031
Kentucky coffeetree	2,223	2,076	--	117	30	3,121	3,121	--
Butternut	3,576	2,390	--	896	290	4,025	4,025	--
Black walnut	197,950	174,129	5,913	13,867	4,043	370,501	359,999	10,502
Sweetgum	87,204	84,591	835	1,317	461	161,865	160,402	1,463
Yellow-poplar	766,566	747,060	4,110	7,352	8,044	2,259,597	2,253,474	6,123
White mulberry	564	200	--	364	--	--	--	--
Red mulberry	10,236	1,240	--	6,636	2,360	--	--	--
Water tupelo	100	100	--	--	--	--	--	--
Blackgum	56,898	50,649	1,201	4,171	877	83,064	81,436	1,628
Swamp tupelo	1,069	1,069	--	--	--	3,598	3,598	--
Sycamore	342,600	313,785	6,096	12,084	10,635	988,489	979,562	8,927
Eastern cottonwood	184,011	178,932	748	2,606	1,725	732,429	730,346	2,083
Bigtooth aspen	36,640	36,066	--	575	--	84,099	84,099	--
Swamp cottonwood	279	279	--	--	--	551	551	--
Quaking aspen	3,900	3,830	--	71	--	5,995	5,995	--

(Table 36A continued on next page)

(Table 36A continued)

Individual species	All live	Major tree class: All live trees: Growing stock	All live trees: Short-log	All live trees: Rough	All live trees: Rotten	Saw-log size trees: Total saw-log size trees	Saw-log size trees: Sawtimber	Saw-log size trees: Short-log
			(In thousand cubic feet)				(In thousand board feet) [1]	
Hardwoods								
Black cherry	202,075	151,921	11,191	35,565	3,397	265,280	248,143	17,138
White oak	694,543	651,191	18,568	17,140	7,643	1,873,238	1,837,985	35,253
Swamp white oak	37,592	36,844	336	284	128	117,231	116,637	594
Scarlet oak	35,544	34,939	265	44	296	89,939	89,417	521
Northern pin oak	15,618	13,785	--	774	1,059	42,340	42,340	--
Southern red oak	513	513	--	--	--	1,054	1,054	--
Cherrybark;swamp red oak	1,444	1,444	--	--	--	2,935	2,935	--
Shingle oak	24,547	21,543	2,038	965	--	59,511	55,581	3,930
Bur oak	18,121	15,291	2,251	579	--	52,083	47,200	4,883
Blackjack oak	320	320	--	--	--	--	--	--
Swamp chestnut oak	189	189	--	--	--	--	--	--
Chinkapin oak	86,753	79,724	3,260	3,435	334	209,593	203,522	6,072
Pin oak	98,035	94,796	235	1,804	1,199	278,766	278,300	465
Chestnut oak	136,053	131,978	1,099	2,098	877	385,615	383,788	1,827
Northern red oak	401,720	380,739	10,420	8,859	1,701	1,225,424	1,204,310	21,114
Shumard oak	10,179	9,767	412	--	--	41,456	40,539	918
Post oak	9,615	9,517	--	72	26	23,723	23,723	--
Black oak	490,514	453,010	13,019	18,424	6,061	1,358,077	1,334,166	23,911
Black locust	54,155	35,125	1,982	10,888	6,160	57,521	54,288	3,233
Black willow	22,971	14,099	1,634	6,901	337	29,844	27,675	2,169
Sassafras	129,461	96,745	3,455	20,560	8,701	109,339	103,959	5,380
American basswood	84,879	70,156	3,660	4,441	6,623	177,523	169,829	7,695
Winged elm	568	568	--	--	--	--	--	--
American elm	112,426	85,150	5,945	20,542	789	109,238	98,351	10,886
Siberian elm	353	--	327	26	--	543	--	543
Slippery elm	84,060	77,100	782	6,058	120	120,330	119,228	1,103
Rock elm	283	283	--	--	--	--	--	--
Total hardwoods	7,473,588	6,622,513	214,783	445,520	190,773	16,995,335	16,609,316	386,019
Total commercial species	7,770,948	6,900,295	217,937	461,021	191,500	17,534,411	17,142,812	391,599
Noncommercial species	38,427	--	--	36,930	1,497	--	--	--
Total all species	7,809,180	6,900,295	217,937	497,951	192,997	17,534,411	17,142,812	391,599

All table cells without observations in the inventory sample are indicated by --. Cells with observations smaller than the precision reported in the table are shown as zero. Columns and rows may not add to their totals due to rounding.

[1] Doyle rule.

Table 37. -- Net volume of noncommercial tree species on timberland by individual species, Indiana, 1998

(In thousand cubic feet)

Noncommercial tree species	Non-growing-stock volume
Tree-of-heaven	927
American hornbeam	1,114
Eastern redbud	5,134
Hawthorn	4,822
Osage-orange	18,102
Apple	1,012
Eastern hophornbeam	6,653
Wild plum	161
All noncommercial species	37,924

All table cells without observations in the inventory sample are indicated by --. Cells with observations smaller than the precision reported in the table are shown as zero. Columns and rows may not add to their totals due to rounding.

Table 38. -- Net volume of growing stock on timberland by species group and forest type group/local type, Indiana, 1998

(In thousand cubic feet)

Species group	All types	Forest type group/local type													
		White-red-jack pine	Loblolly-shortleaf pine	Oak-pine				Oak-hickory	Oak-gum-cypress	Elm-ash-cottonwood	Maple-beech-birch			Aspen-birch	Non-stocked
		White pine	Shortleaf-Virginia pine	Total	Eastern redcedar	Eastern redcedar-hardwood	Oak-pine	Oak-hickory	Oak-gum-cypress	Elm-ash-cottonwood	Total	Maple-beech	Cherry-ash-yellow poplar	Aspen-birch	Non-stocked
Softwoods															
Jack pine	5,050	--	1,436	2,976	--	--	2,976	--	--	304	334	334	--	--	--
Red pine	12,037	10,989	--	580	--	--	580	86	--	--	382	382	--	--	--
White pine	72,958	36,859	49	22,171	--	606	21,565	9,852	--	740	3,287	3,287	--	--	--
Shortleaf pine	39,112	2,665	28,074	6,638	--	1,435	5,204	817	--	180	737	737	--	--	--
Virginia pine	90,051	4,721	45,928	28,421	--	3,687	24,734	7,366	--	332	3,283	2,426	857	--	--
Baldcypress	3,538	--	--	--	--	--	--	--	--	3,538	--	--	--	--	--
Eastern redcedar	49,543	--	816	29,624	7,943	21,015	667	11,802	--	866	6,434	6,044	390	--	--
Other softwoods	5,493	688	--	1,738	--	--	1,738	88	--	1,890	1,090	505	585	--	--
Total	277,782	55,921	76,303	92,148	7,943	26,743	57,463	30,012	--	7,851	15,547	13,716	1,831	--	--
Hardwoods															
Select white oak	783,239	--	--	6,300	585	4,757	958	622,072	1,489	26,931	126,448	117,399	9,049	--	--
Other white oak	141,495	--	--	92	92	--	--	133,625	--	--	7,778	7,778	--	--	--
Select red oak	391,761	--	353	1,107	299	--	808	265,158	1,773	3,612	119,758	116,918	2,840	--	--
Other red oak	620,742	--	588	15,560	950	5,053	9,556	445,766	42,129	26,783	89,884	86,577	3,307	32	--
Select hickory	290,579	--	483	4,477	37	3,321	1,118	204,930	675	14,623	65,035	60,881	4,154	356	--
Other hickory	418,623	--	691	4,293	--	3,311	983	274,472	190	9,115	129,862	124,022	5,840	--	--
Basswood	70,156	--	--	96	--	96	--	12,387	--	5,548	52,125	51,671	454	--	--
Beech	161,528	--	--	40	--	--	40	27,799	120	2,236	131,332	131,052	280	--	--
Hard maple	665,556	191	2,103	7,551	--	6,382	1,169	139,552	--	13,743	502,061	492,122	9,939	353	--
Soft maple	346,423	1,079	970	3,230	--	1,580	1,650	48,989	2,103	193,036	96,026	88,456	7,570	990	--
Elm	163,020	1,131	441	2,463	46	699	1,718	24,737	1,266	35,537	97,446	83,256	14,190	--	--
Black ash	7,653	50	--	--	--	--	--	1,988	--	2,218	3,397	3,215	182	--	--
White & green ash	486,797	38	280	13,744	333	9,660	3,752	108,087	1,968	94,935	267,416	204,382	63,034	329	--
Sycamore	313,785	121	2,294	7,145	--	2,024	5,121	30,559	1,046	163,168	109,453	107,066	2,388	--	--
Cottonwood	178,932	876	--	6,767	--	--	6,767	2,807	4,455	151,370	12,657	10,797	1,860	--	--
Willow	14,099	--	--	--	--	--	--	--	71	10,468	3,560	2,804	756	--	--
Hackberry	79,780	102	--	487	--	487	--	6,944	356	39,274	32,618	29,480	3,138	--	--
Bigtooth aspen	35,779	--	--	423	--	423	--	16,192	--	2,548	12,999	12,266	732	3,617	--
Quaking aspen	4,116	--	--	--	--	--	--	756	775	401	1,448	--	1,448	736	--
River birch	22,311	911	--	6,161	--	--	6,161	1,279	--	13,240	721	721	--	--	--
Sweetgum	84,591	--	--	2,496	--	148	2,348	21,459	14,036	15,928	30,673	29,282	1,390	--	--
Tupelo	49,103	58	133	914	--	268	645	17,662	3,629	6,321	20,387	19,034	1,353	--	--
Black cherry	151,921	737	2,020	5,406	928	1,459	3,018	33,747	340	14,701	94,970	47,668	47,302	--	--
Black walnut	174,129	471	696	1,490	292	1,199	--	26,132	159	29,142	115,786	74,500	41,286	253	--
Butternut	2,390	--	58	--	--	--	--	328	--	--	2,003	2,003	--	--	--
Yellow-poplar	747,060	7,366	4,897	19,308	1,780	3,924	13,605	198,504	2,028	53,992	459,993	339,363	120,629	972	--
Other hardwoods	216,946	1,305	1,413	4,445	308	3,056	1,081	77,910	928	51,301	79,286	67,498	11,787	359	--
Total	6,622,513	14,434	17,419	113,993	5,649	47,845	60,499	2,743,840	79,536	980,172	2,665,121	2,310,212	354,910	7,997	--
All species	6,900,295	70,355	93,722	206,142	13,592	74,588	117,962	2,773,852	79,536	988,023	2,680,668	2,323,927	356,741	7,997	--

All table cells without observations in the inventory sample are indicated by --. Cells with observations smaller than the precision reported in the table are shown as zero. Columns and rows may not add to their totals due to rounding.

Table 39. -- Net volume of sawtimber (International 1/4-inch rule) on timberland by species group and forest type group/local type, Indiana, 1998

(In thousand board feet) [1]

Species group	All types	Forest type group/local type													
		White-red-jack pine	Loblolly-shortleaf pine	Oak-pine				Oak-hickory	Oak-gum-cypress	Elm-ash-cottonwood	Maple-beech-birch			Aspen-birch	Non-stocked
		White pine	Shortleaf-Virginia pine	Total	Eastern redcedar	Eastern redcedar-hardwood	Oak-pine	Oak-hickory	Oak-gum-cypress	Elm-ash-cottonwood	Total	Maple-beech	Cherry-ash-yellow poplar	Aspen-birch	Non-stocked
Softwoods															
Jack pine	18,765	--	4,301	11,365	--	--	11,365	--	--	1,467	1,632	1,632	--	--	--
Red pine	36,417	33,981	--	744	--	--	744	--	--	--	1,693	1,693	--	--	--
White pine	296,188	157,623	--	78,286	--	975	77,311	44,896	--	2,561	12,822	12,822	--	--	--
Shortleaf pine	160,903	10,871	119,319	24,831	--	7,014	17,817	2,996	--	897	1,989	1,989	--	--	--
Virginia pine	346,543	14,611	178,973	105,210	--	9,206	96,004	33,479	--	1,670	12,599	11,751	848	--	--
Baldcypress	15,649	--	--	--	--	--	--	--	--	15,649	--	--	--	--	--
Eastern redcedar	120,276	--	768	78,077	15,033	61,426	1,619	22,712	--	3,691	15,028	14,354	674	--	--
Other softwoods	9,895	--	--	5,112	--	--	5,112	--	--	4,782	--	--	--	--	--
Total	1,004,636	217,086	303,361	303,625	15,033	78,621	209,972	104,084	--	30,717	45,764	44,241	1,522	--	--
Hardwoods															
Select white oak	3,229,557	--	--	18,152	--	15,020	3,132	2,577,874	5,351	109,888	518,292	483,280	35,011	--	--
Other white oak	651,284	--	--	--	--	--	--	616,261	--	--	35,023	35,023	--	--	--
Select red oak	1,699,636	--	1,743	1,273	1,273	--	--	1,162,901	8,667	13,466	511,585	501,721	9,865	--	--
Other red oak	2,648,745	--	1,412	61,709	--	22,249	39,460	1,920,533	179,396	105,706	379,989	366,099	13,890	--	--
Select hickory	1,038,553	--	1,764	16,288	--	12,159	4,129	726,439	3,260	54,156	234,922	225,021	9,901	1,723	--
Other hickory	1,636,003	--	2,170	16,536	--	14,087	2,450	1,055,523	--	37,182	524,592	503,036	21,555	--	--
Basswood	262,037	--	--	--	--	--	--	44,058	--	13,157	204,822	204,822	--	--	--
Beech	665,713	--	--	--	--	--	--	93,584	--	9,386	562,743	562,743	--	--	--
Hard maple	2,217,682	--	5,354	23,042	--	20,856	2,186	380,501	--	45,495	1,761,588	1,730,377	31,211	1,701	--
Soft maple	1,072,160	4,738	1,444	835	--	--	835	128,760	6,074	655,679	274,630	250,624	24,007	--	--
Elm	370,564	--	--	2,870	--	--	2,870	47,406	1,953	86,656	231,678	213,056	18,622	--	--
Black ash	18,559	--	--	--	--	--	--	4,210	--	3,408	10,941	10,941	--	--	--
White & green ash	1,736,046	--	--	43,611	--	32,870	10,740	388,442	6,682	316,766	979,062	780,177	198,884	1,484	--
Sycamore	1,318,720	--	8,294	17,777	--	6,833	10,945	121,371	4,079	689,433	477,765	470,802	6,963	--	--
Cottonwood	847,993	2,591	--	29,237	--	--	29,237	11,594	22,852	727,748	53,972	47,156	6,816	--	--
Willow	46,178	--	--	--	--	--	--	--	--	30,177	16,001	12,640	3,361	--	--
Hackberry	243,972	--	--	1,666	--	1,666	--	18,810	--	126,665	96,831	88,992	7,839	--	--
Bigtooth aspen	145,053	--	--	--	--	--	--	67,521	--	9,547	52,741	48,961	3,780	15,245	--
Quaking aspen	9,653	--	--	--	--	--	--	1,010	3,175	1,669	3,799	--	3,799	--	--
River birch	44,000	--	--	6,972	--	--	6,972	--	--	34,620	2,409	2,409	--	--	--
Sweetgum	272,332	--	--	2,791	--	--	2,791	70,390	53,212	53,986	91,953	86,517	5,436	--	--
Tupelo	132,410	--	--	1,268	--	--	1,268	40,586	11,564	16,566	62,426	59,188	3,238	--	--
Black cherry	424,466	--	8,031	14,181	2,942	2,976	8,263	103,513	--	35,801	262,941	141,098	121,843	--	--
Black walnut	639,339	--	3,381	2,727	--	2,727	--	98,892	--	101,558	431,552	289,794	141,758	1,229	--
Butternut	8,139	--	--	--	--	--	--	1,492	--	--	6,647	6,647	--	--	--
Yellow-poplar	3,359,811	38,391	19,017	81,101	5,194	14,206	61,701	907,601	7,866	248,114	2,052,790	1,523,298	529,493	4,930	--
Other hardwoods	504,060	1,043	--	4,326	--	4,326	--	148,697	--	136,715	213,279	192,759	20,520	--	--
Total	25,242,665	46,762	52,610	346,363	9,408	149,975	186,980	10,737,969	314,131	3,663,544	10,054,973	8,837,181	1,217,792	26,312	--
All species	26,247,301	263,848	355,971	649,988	24,441	228,595	396,952	10,842,053	314,131	3,694,261	10,100,737	8,881,423	1,219,314	26,312	--

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[1] International 1/4-inch rule.

Table 39A. -- Net volume of sawtimber (Doyle rule) on timberland by species group and forest type group/local type, Indiana, 1998

(In thousand board feet) [1]

Species group	All types	Forest type group/local type													
		White-red-jack pine	Loblolly-shortleaf pine	Oak-pine				Oak-hickory	Oak-gum-cypress	Elm-ash-cottonwood	Maple-beech-birch			Aspen-birch	Non-stocked
		White pine	Shortleaf-Virginia pine	Total	Eastern redcedar	Eastern redcedar-hardwood	Oak-pine	Oak-hickory	Oak-gum-cypress	Elm-ash-cottonwood	Total	Maple-beech	Cherry-ash-yellow poplar	Aspen-birch	Non-stocked
Softwoods															
Jack pine	8,727	--	1,716	5,526	--	--	5,526	--	--	507	978	978	--	--	--
Red pine	15,129	14,287	--	257	--	--	257	--	--	--	585	585	--	--	--
White pine	164,227	88,979	--	39,418	--	337	39,082	26,901	--	1,224	7,704	7,704	--	--	--
Shortleaf pine	82,820	6,006	62,293	11,866	--	4,104	7,762	1,035	--	429	1,192	1,192	--	--	--
Virginia pine	192,035	5,481	98,817	61,720	--	3,704	58,016	18,242	--	577	7,197	6,904	293	--	--
Baldcypress	11,140	--	--	--	--	--	--	--	--	11,140	--	--	--	--	--
Eastern redcedar	55,654	--	265	37,466	8,275	28,541	650	9,385	--	1,539	6,998	6,765	233	--	--
Other softwoods	3,764	--	--	1,970	--	--	1,970	--	--	1,794	--	--	--	--	--
Total	533,496	114,753	163,092	158,224	8,275	36,686	113,263	55,563	--	17,210	24,654	24,128	526	--	--
Hardwoods															
Select white oak	2,205,344	--	--	10,918	--	8,909	2,009	1,759,279	2,895	70,356	361,895	334,803	27,092	--	--
Other white oak	407,511	--	--	--	--	--	--	385,561	--	--	21,950	21,950	--	--	--
Select red oak	1,247,784	--	727	531	531	--	--	845,969	5,961	9,097	385,499	379,940	5,559	--	--
Other red oak	1,806,918	--	589	41,379	--	14,453	26,925	1,281,917	129,956	74,712	278,364	270,758	7,606	--	--
Select hickory	587,868	--	736	8,768	--	6,191	2,577	406,646	1,666	33,185	135,736	130,171	5,565	1,132	--
Other hickory	962,894	--	1,176	8,982	--	7,223	1,759	603,203	--	21,960	327,572	314,642	12,930	--	--
Basswood	169,829	--	--	--	--	--	--	24,618	--	9,533	135,679	135,679	--	--	--
Beech	458,728	--	--	--	--	--	--	61,358	--	5,094	392,276	392,276	--	--	--
Hard maple	1,360,253	--	4,055	13,707	--	12,271	1,436	214,509	--	28,510	1,098,602	1,081,244	17,357	871	--
Soft maple	713,840	2,607	603	348	--	--	348	85,907	3,282	430,428	190,665	172,011	18,654	--	--
Elm	217,579	--	--	2,060	--	--	2,060	22,931	815	55,239	136,534	126,952	9,582	--	--
Black ash	9,767	--	--	--	--	--	--	2,499	--	1,422	5,845	5,845	--	--	--
White & green ash	1,077,604	--	--	27,170	--	20,715	6,455	232,953	3,994	193,597	619,271	500,087	119,184	619	--
Sycamore	979,562	--	4,681	8,428	--	3,275	5,153	80,590	1,921	527,239	356,703	352,129	4,574	--	--
Cottonwood	730,346	1,524	--	16,349	--	--	16,349	10,001	15,027	643,725	43,720	39,434	4,287	--	--
Willow	27,675	--	--	--	--	--	--	--	--	17,734	9,941	7,964	1,977	--	--
Hackberry	149,874	--	--	695	--	695	--	12,004	--	78,052	59,123	54,321	4,802	--	--
Bigtooth aspen	84,099	--	--	--	--	--	--	39,693	--	4,475	31,348	29,125	2,223	8,582	--
Quaking aspen	5,995	--	--	--	--	--	--	421	2,642	696	2,235	--	2,235	--	--
River birch	22,606	--	--	2,909	--	--	2,909	--	--	18,693	1,005	1,005	--	--	--
Sweetgum	160,402	--	--	1,164	--	--	1,164	41,795	28,965	31,065	57,412	54,202	3,211	--	--
Tupelo	75,377	--	--	649	--	--	649	23,880	6,243	10,172	34,434	32,682	1,751	--	--
Black cherry	248,143	--	4,863	6,249	1,388	1,241	3,619	63,258	--	20,336	153,436	85,555	67,882	--	--
Black walnut	359,999	--	1,570	1,138	--	1,138	--	58,576	--	56,669	241,533	164,541	76,991	513	--
Butternut	4,025	--	--	--	--	--	--	623	--	--	3,402	3,402	--	--	--
Yellow-poplar	2,253,474	25,608	14,197	54,800	4,830	9,260	40,711	619,737	4,624	164,606	1,366,874	1,009,616	357,258	3,028	--
Other hardwoods	281,824	435	--	2,031	--	2,031	--	76,543	--	81,921	120,893	109,914	10,979	--	--
Total	16,609,316	30,173	33,197	208,275	6,749	87,402	114,124	6,954,470	207,990	2,588,516	6,571,949	5,810,250	761,699	14,745	--
All species	17,142,812	144,926	196,289	366,499	15,024	124,088	227,387	7,010,034	207,990	2,605,726	6,596,603	5,834,377	762,225	14,745	--

All table cells without observations in the inventory sample are indicated by --. Cells with observations smaller than the precision reported in the table are shown as zero. Columns and rows may not add to their totals due to rounding.

[1] Doyle rule.

Table 40. -- Net volume of short-log trees (cull volume) in cubic feet on timberland by species group and diameter class, Indiana, 1998

(In thousand cubic feet)

Species group	All classes	Diameter class (inches at breast height)							
		9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
Softwoods									
Jack pine	270	270	--	--	--	--	--	--	--
Shortleaf pine	302	302	--	--	--	--	--	--	--
Virginia pine	1,361	464	--	560	--	--	--	338	--
Eastern redcedar	1,221	734	487	--	--	--	--	--	--
Total softwoods	3,154	1,769	487	560	--	--	--	338	--
Hardwoods									
Select white oak	24,415	--	945	1,880	2,984	1,610	4,059	9,298	3,641
Other white oak	1,099	--	601	166	--	--	--	332	--
Select red oak	10,832	--	--	763	634	273	2,179	6,479	504
Other red oak	15,557	--	993	1,733	451	2,110	1,351	4,980	3,939
Select hickory	7,263	--	589	1,525	1,034	1,473	588	2,056	--
Other hickory	10,354	--	1,010	1,562	1,005	2,595	2,633	1,548	--
Basswood	3,660	--	265	--	585	--	637	1,267	906
Beech	7,340	--	488	--	609	2,107	359	3,777	--
Hard maple	24,882	--	2,396	1,566	4,544	4,167	3,783	8,427	--
Soft maple	36,479	--	2,508	4,518	6,370	5,970	3,794	5,560	7,758
Elm	7,054	--	2,314	1,048	2,386	--	252	1,055	--
White & green ash	19,593	--	2,058	3,941	3,565	3,210	357	4,100	2,362
Sycamore	6,096	--	704	1,884	--	1,750	--	1,758	--
Cottonwood	748	--	--	--	--	--	--	--	748
Willow	1,634	--	354	410	--	870	--	--	--
Hackberry	4,198	--	580	523	287	--	--	2,355	452
River birch	498	--	--	--	498	--	--	--	--
Sweetgum	835	--	--	--	262	256	316	--	--
Tupelo	1,201	--	426	775	--	--	--	--	--
Black cherry	11,191	--	2,452	3,986	1,621	2,549	--	583	--
Black walnut	5,913	--	2,625	1,803	701	--	783	--	--
Yellow-poplar	4,110	--	481	922	1,036	--	353	883	435
Other hardwoods	9,830	--	2,720	1,825	1,770	2,568	287	439	222
Total hardwoods	214,783	--	24,511	30,830	30,340	31,507	21,730	54,899	20,966
All species	217,937	1,769	24,998	31,390	30,340	31,507	21,730	55,236	20,966

All table cells without observations in the inventory sample are indicated by --. Cells with observations smaller than the precision reported in the table are shown as zero. Columns and rows may not add to their totals due to rounding.

Table 41. -- Net volume of short-log trees (International 1/4-inch rule - cull volume) in board feet on timberland by species group and diameter class, Indiana, 1998

(In thousand board feet) [1]

Species group	All classes	Diameter class (inches at breast height)							
		9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
Softwoods									
Jack pine	1,050	1,050	--	--	--	--	--	--	--
Shortleaf pine	1,308	1,308	--	--	--	--	--	--	--
Virginia pine	4,914	1,995	--	2,106	--	--	--	812	--
Eastern redcedar	5,357	3,390	1,967	--	--	--	--	--	--
Total softwoods	12,629	7,744	1,967	2,106	--	--	--	812	--
Hardwoods									
Select white oak	62,558	--	2,949	5,754	8,901	4,652	11,297	23,647	5,359
Other white oak	3,510	--	2,253	584	--	--	--	673	--
Select red oak	28,130	--	--	2,285	1,878	774	6,063	16,208	922
Other red oak	37,982	--	3,320	5,453	1,423	6,089	3,734	11,389	6,574
Select hickory	18,337	--	1,849	4,533	2,752	3,701	1,406	4,096	--
Other hickory	29,450	--	3,344	4,951	3,020	7,480	7,080	3,575	--
Basswood	9,580	--	760	--	1,639	--	1,740	3,341	2,100
Beech	19,767	--	1,393	--	1,707	5,837	982	9,848	--
Hard maple	61,060	--	6,879	4,375	12,265	10,868	9,230	17,444	--
Soft maple	92,047	--	6,417	11,669	16,551	15,497	9,819	13,944	18,150
Elm	22,770	--	7,679	3,448	7,704	--	784	3,154	--
White & green ash	55,484	--	6,581	12,491	11,110	9,736	1,025	9,922	4,619
Sycamore	14,272	--	1,561	4,233	--	4,190	--	4,288	--
Cottonwood	1,835	--	--	--	--	--	--	--	1,835
Willow	3,809	--	812	958	--	2,040	--	--	--
Hackberry	11,765	--	1,965	1,716	923	--	--	6,158	1,002
River birch	1,392	--	--	--	1,392	--	--	--	--
Sweetgum	2,228	--	--	--	725	692	811	--	--
Tupelo	3,408	--	1,225	2,183	--	--	--	--	--
Black cherry	31,240	--	7,025	11,347	4,558	6,958	--	1,351	--
Black walnut	21,079	--	9,900	6,518	2,390	--	2,271	--	--
Yellow-poplar	10,014	--	1,474	2,765	2,948	--	921	1,797	109
Other hardwoods	26,915	--	7,769	5,160	4,915	6,948	743	1,033	347
Total hardwoods	568,631	--	75,152	90,424	86,802	85,462	57,906	131,868	41,017
All species	581,260	7,744	77,118	92,531	86,802	85,462	57,906	132,681	41,017

All table cells without observations in the inventory sample are indicated by --. Cells with observations smaller than the precision reported in the table are shown as zero. Columns and rows may not add to their totals due to rounding.

[1] International 1/4-inch rule.

Table 41A. -- Net volume of short-log trees (Doyle rule - cull volume) in board feet on timberland by species group and diameter class, Indiana, 1998

(In thousand board feet) [1]

Species group	All classes	Diameter class (inches at breast height)							
		9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
Softwoods									
Jack pine	363	363	--	--	--	--	--	--	--
Shortleaf pine	452	452	--	--	--	--	--	--	--
Virginia pine	2,654	689	--	1,262	--	--	--	702	--
Eastern redcedar	2,111	1,171	940	--	--	--	--	--	--
Total softwoods	5,580	2,675	940	1,262	--	--	--	702	--
Hardwoods									
Select white oak	46,801	--	1,230	2,945	5,235	3,056	8,111	20,142	6,082
Other white oak	1,827	--	940	299	--	--	--	588	--
Select red oak	22,031	--	--	1,170	1,105	508	4,353	13,849	1,047
Other red oak	28,828	--	1,385	2,791	837	4,000	2,681	9,673	7,461
Select hickory	11,437	--	771	2,320	1,619	2,431	1,010	3,286	--
Other hickory	18,747	--	1,395	2,534	1,776	4,913	5,083	3,045	--
Basswood	7,695	--	317	--	964	--	1,250	2,781	2,383
Beech	14,339	--	581	--	1,004	3,835	705	8,215	--
Hard maple	40,967	--	2,870	2,239	7,214	7,139	6,627	14,878	--
Soft maple	68,704	--	2,677	5,972	9,735	10,180	7,050	12,490	20,598
Elm	12,532	--	3,204	1,765	4,532	--	563	2,469	--
White & green ash	36,934	--	2,745	6,393	6,535	6,396	736	8,887	5,242
Sycamore	8,927	--	651	2,166	--	2,753	--	3,357	--
Cottonwood	2,083	--	--	--	--	--	--	--	2,083
Willow	2,169	--	339	490	--	1,340	--	--	--
Hackberry	9,212	--	820	878	543	--	--	5,834	1,137
River birch	819	--	--	--	819	--	--	--	--
Sweetgum	1,463	--	--	--	426	455	582	--	--
Tupelo	1,628	--	511	1,117	--	--	--	--	--
Black cherry	17,138	--	2,931	5,807	2,681	4,571	--	1,147	--
Black walnut	10,502	--	4,130	3,336	1,406	--	1,631	--	--
Yellow-poplar	6,123	--	615	1,415	1,734	--	661	1,575	123
Other hardwoods	15,111	--	3,241	2,641	2,891	4,564	533	846	394
Total hardwoods	386,019	--	31,353	46,279	51,057	56,140	41,576	113,063	46,550
All species	391,599	2,675	32,293	47,541	51,057	56,140	41,576	113,766	46,550

All table cells without observations in the inventory sample are indicated by --. Cells with observations smaller than the precision reported in the table are shown as zero. Columns and rows may not add to their totals due to rounding.

[1] Doyle rule.

Table 42. -- Average annual net growth of growing stock and sawtimber (International 1/4-inch rule) on timberland, 1966 to 1986 and 1986 to 1997, and current annual net growth of growing stock and sawtimber, 1997, by Forest Survey Unit and softwoods and hardwoods, Indiana

Forest Survey Unit and softwoods and hardwoods	Growing stock			Sawtimber		
	Average annual net growth 1966 -1986	Average annual net growth 1986 -1997	Current annual net growth 1997	Average annual net growth 1966 -1986	Average annual net growth 1986 - 1997	Current annual net growth 1997
	(In thousand cubic feet)			(In thousand board feet)[1]		
Lower Wabash Unit						
Softwoods	1,108	1,550	1,327	5,599	7,814	4,360
Hardwoods	31,034	44,331	43,825	148,202	189,157	133,535
Total	32,142	45,880	45,153	153,801	196,972	137,895
Knobs Unit						
Softwoods	4,013	5,453	4,563	24,785	25,859	13,819
Hardwoods	64,933	80,984	86,603	321,337	358,407	273,371
Total	68,946	86,437	91,166	346,122	384,266	287,190
Upland Flats Unit						
Softwoods	856	1,170	742	713	1,729	923
Hardwoods	15,911	27,948	24,076	61,647	109,626	68,736
Total	16,767	29,118	24,818	62,360	111,355	69,660
Northern Unit						
Softwoods	661	612	697	8,206	4,487	2,425
Hardwoods	35,119	64,280	49,968	155,455	245,802	144,253
Total	35,780	64,892	50,666	163,661	250,289	146,678
All Units						
Softwoods	6,638	8,784	7,330	39,303	39,889	21,528
Hardwoods	146,997	217,543	204,472	686,641	902,992	619,895
Total	153,635	226,327	211,802	725,944	942,881	641,423

All table cells without observations in the inventory sample are indicated by --. Cells with observations smaller than the precision reported in the table are shown as zero. Columns and rows may not add to their totals due to rounding.
[1] International 1/4-inch rule.

Table 42A. -- Average annual net growth of growing stock and sawtimber (Doyle rule) on timberland, 1986 to 1997, and current annual net growth of growing stock and sawtimber, 1997, by Forest Survey Unit and softwoods and hardwoods, Indiana

Forest Survey Unit and softwoods and hardwoods	Growing stock		Sawtimber	
	Average annual net growth 1986 -1997	Current annual net growth 1997	Average annual net growth 1986 - 1997	Current annual net growth 1997
	(In thousand cubic feet)		(In thousand board feet)[1]	
Lower Wabash Unit				
Softwoods	1,550	1,327	3,663	2,083
Hardwoods	44,331	43,825	108,383	77,310
Total	45,880	45,153	112,046	79,392
Knobs Unit				
Softwoods	5,453	4,563	11,159	6,280
Hardwoods	80,984	86,603	200,038	154,858
Total	86,437	91,166	211,197	161,138
Upland Flats Unit				
Softwoods	1,170	742	737	364
Hardwoods	27,948	24,076	64,039	38,856
Total	29,118	24,818	64,776	39,220
Northern Unit				
Softwoods	612	697	1,913	1,119
Hardwoods	64,280	49,968	143,085	84,613
Total	64,892	50,666	144,997	85,732
All Units				
Softwoods	8,784	7,330	17,471	9,845
Hardwoods	217,543	204,472	515,545	355,637
Total	226,327	211,802	533,016	365,482

All table cells without observations in the inventory sample are indicated by --. Cells with observations smaller than the precision reported in the table are shown as zero. Columns and rows may not add to their totals due to rounding.

[1] Doyle rule.

Table 43. -- Average annual net growth of growing stock on timberland by species group and forest type group/local type, Indiana, 1986-1997

(In thousand cubic feet)

Species group	All types	Forest type group/local type													
		White-red-jack pine	Loblolly-shortleaf pine	Oak-pine				Oak-hickory	Oak-gum-cypress	Elm-ash-cottonwood	Maple-beech-birch			Aspen-birch	Non-stocked
		White pine	Shortleaf-Virginia pine	Total	Eastern redcedar	Eastern redcedar-hardwood	Oak-pine	Oak-hickory	Oak-gum-cypress	Elm-ash-cottonwood	Total	Maple-beech	Cherry-ash-yellow poplar	Aspen-birch	Non-stocked
Softwoods															
Jack pine	110	--	--	60	--	--	60	36	--	7	7	7	--	--	--
Red pine	77	22	--	44	--	--	44	-11	--	--	21	21	--	--	--
White pine	2,536	1,054	138	901	--	12	889	304	--	38	92	92	--	--	10
Shortleaf pine	1,036	71	607	211	--	71	140	73	--	--	69	63	7	--	--
Virginia pine	2,590	174	1,217	910	--	243	667	176	--	6	106	91	15	--	--
Baldcypress	257	--	--	--	--	--	--	--	--	257	--	--	--	--	--
Eastern redcedar	2,075	--	29	1,200	400	754	45	458	--	143	241	215	26	--	--
Other softwoods	103	51	--	32	--	--	32	14	--	-14	21	10	11	--	--
Total	8,784	1,372	1,991	3,358	400	1,080	1,877	1,051	--	436	557	499	58	--	10
Hardwoods															
Select white oak	19,303	36	--	414	17	239	157	13,212	130	818	4,605	4,122	483	--	2
Other white oak	2,796	--	--	28	28	0	--	2,521	--	2	238	238	--	--	7
Select red oak	12,339	--	57	43	--	24	19	7,497	44	405	4,009	3,828	181	--	129
Other red oak	18,350	53	23	543	86	212	246	12,000	1,430	1,056	3,025	2,547	478	8	61
Select hickory	7,083	6	10	95	25	49	21	4,324	14	244	2,312	2,228	84	6	--
Other hickory	10,338	--	43	101	21	30	51	6,275	4	259	3,576	3,154	422	--	--
Basswood	2,311	--	--	36	--	36	--	536	--	461	1,278	1,200	78	--	--
Beech	6,051	--	--	12	--	12	--	1,349	--	368	4,264	4,155	109	--	16
Yellow birch	49	--	--	--	--	--	--	--	--	49	--	--	--	--	--
Hard maple	21,954	40	59	324	8	262	54	5,450	-13	779	15,150	14,732	418	7	-1
Soft maple	16,106	26	158	306	--	198	108	2,616	486	8,358	4,023	3,310	713	25	--
Elm	7,667	22	24	57	3	34	20	1,154	96	1,427	4,856	4,109	747	--	11
Black ash	434	36	--	7	--	7	--	138	--	85	169	154	15	--	--
White & green ash	17,847	49	30	298	32	197	68	3,782	51	3,684	9,754	7,231	2,523	8	8
Sycamore	10,568	75	62	132	--	18	113	1,107	239	4,893	3,988	3,578	410	--	--
Cottonwood	5,711	4	-13	214	--	--	214	669	121	4,152	533	298	235	--	--
Willow	742	--	--	--	--	--	--	183	--	317	220	232	-12	--	-1
Hackberry	3,203	1	--	9	--	9	--	271	38	1,745	1,116	814	302	--	--
Bigtooth aspen	1,146	--	--	--	--	--	--	605	--	57	387	353	35	68	--
Quaking aspen	197	--	--	--	--	--	--	13	8	62	69	13	57	45	--
River birch	717	23	--	164	--	--	164	68	4	446	36	36	--	--	13
Sweetgum	2,493	--	89	80	--	3	76	600	344	486	842	747	95	--	--
Tupelo	1,512	0	20	153	--	85	67	463	196	157	523	456	67	--	--
Black cherry	7,542	125	-2	155	57	17	80	1,452	202	1,072	4,453	2,849	1,604	--	22
Black walnut	6,142	--	32	11	4	7	--	1,044	0	1,140	3,808	2,334	1,474	5	--
Butternut	107	--	5	--	--	--	--	6	--	--	96	96	--	--	--
Yellow-poplar	27,440	21	198	960	67	313	580	7,702	86	2,191	15,651	11,889	3,763	22	63
Other hardwoods	7,451	17	79	97	29	39	30	2,591	28	1,728	2,788	2,283	506	11	-20
Total	217,600	534	873	4,239	377	1,792	2,070	77,628	3,507	36,442	91,769	76,984	14,785	204	311
All species	226,327	1,906	2,864	7,596	777	2,872	3,947	78,666	3,507	36,855	92,305	77,462	14,843	204	320

All table cells without observations in the inventory sample are indicated by --. Cells with observations smaller than the precision reported in the table are shown as zero. Columns and rows may not add to their totals due to rounding.

Table 44. -- Average annual net growth of sawtimber (International 1/4-inch rule) on timberland by species group and forest type group/local type, Indiana, 1986-1997

(In thousand board feet) [1]

Species group	All types	Forest type group/local type													
		White-red-jack pine	Loblolly-shortleaf pine	Oak-pine				Oak-hickory	Oak-gum-cypress	Elm-ash-cottonwood	Maple-beech-birch			Aspen-birch	Non-stocked
		White pine	Shortleaf-Virginia pine	Total	Eastern redcedar	Eastern redcedar-hardwood	Oak-pine	Oak-hickory	Oak-gum-cypress	Elm-ash-cottonwood	Total	Maple-beech	Cherry-ash-yellow poplar	Aspen-birch	Non-stocked
Softwoods															
Jack pine	501	--	--	387	--	--	387	--	--	80	34	34	--	--	--
Red pine	712	497	--	148	--	--	148	-32	--	--	100	100	--	--	--
White pine	14,127	7,625	344	4,185	--	53	4,132	1,491	--	133	304	304	--	--	46
Shortleaf pine	6,300	283	3,838	1,462	--	369	1,093	389	--	--	305	268	37	--	--
Virginia pine	11,770	392	5,473	4,107	--	797	3,309	1,251	--	38	511	484	27	--	--
Baldcypress	1,211	--	--	--	--	--	--	--	--	1,211	--	--	--	--	--
Eastern redcedar	4,889	--	108	2,632	296	2,139	197	1,128	--	253	767	755	12	--	--
Other softwoods	378	--	--	--	--	--	--	73	--	305	--	--	--	--	--
Total	39,889	8,797	9,762	12,921	296	3,359	9,266	4,299	--	2,020	2,021	1,944	77	--	46
Hardwoods															
Select white oak	87,262	172	--	1,336	--	770	566	61,373	643	3,772	19,647	17,560	2,087	--	0
Other white oak	13,872	--	--	13	13	--	--	12,748	--	11	1,064	1,064	--	--	36
Select red oak	58,147	--	365	244	--	272	-28	35,403	208	1,351	19,251	18,500	750	--	642
Other red oak	84,905	110	102	2,888	263	910	1,715	55,680	6,044	5,229	14,151	12,528	1,623	--	215
Select hickory	34,741	--	31	255	--	178	77	22,564	178	946	10,610	10,512	98	27	--
Other hickory	53,805	--	106	581	103	370	108	34,759	--	1,296	16,722	15,427	1,295	--	--
Basswood	9,636	--	--	--	--	--	--	2,565	--	1,837	5,233	4,935	298	--	--
Beech	28,367	--	--	--	--	--	--	5,900	--	1,922	20,408	20,077	330	--	--
Yellow birch	144	--	--	--	--	--	--	--	--	144	--	--	--	--	--
Hard maple	82,694	--	39	1,348	115	1,053	180	18,329	--	2,941	59,790	58,358	1,433	35	--
Soft maple	54,915	170	163	426	--	426	--	7,439	2,174	30,524	13,887	11,240	2,647	--	--
Elm	16,349	--	--	--	--	--	--	3,093	154	2,756	10,514	9,678	836	--	0
Black ash	1,607	164	--	--	--	--	--	285	--	507	651	651	--	--	--
White & green ash	71,127	277	9	1,012	107	837	68	15,835	159	14,577	38,640	31,012	7,628	81	74
Sycamore	47,117	357	277	399	--	27	372	4,574	1,029	22,095	18,207	16,158	2,049	--	--
Cottonwood	27,212	108	4	1,184	--	--	1,184	2,891	335	19,757	2,893	1,883	1,010	--	--
Willow	1,791	--	--	--	--	--	--	583	--	631	562	674	-111	--	--
Hackberry	9,396	0	--	95	--	95	--	678	128	5,672	2,776	2,305	471	--	--
Bigtooth aspen	4,388	--	--	--	--	--	--	2,258	--	132	1,587	1,481	106	350	--
Quaking aspen	417	--	--	--	--	--	--	14	13	273	116	--	116	--	--
River birch	1,552	--	--	316	--	--	316	0	124	945	106	106	--	--	61
Sweetgum	10,051	--	396	127	--	--	127	2,581	1,799	1,728	3,370	2,941	429	--	--
Tupelo	5,163	--	91	851	--	301	551	1,229	674	345	1,972	1,830	141	--	--
Black cherry	24,535	430	--	605	152	--	453	5,373	679	2,946	14,441	10,456	3,985	--	--
Black walnut	24,717	--	137	109	--	109	--	4,815	--	3,614	15,735	10,478	5,257	77	--
Butternut	340	--	--	--	--	--	--	91	--	--	249	249	--	--	--
Yellow-poplar	130,061	111	958	3,988	222	1,438	2,328	36,260	589	9,801	75,454	57,016	18,439	163	369
Other hardwoods	18,680	0	89	0	--	0	--	4,985	134	4,026	9,328	7,890	1,438	--	-57
Total	902,992	1,901	2,767	15,775	974	6,784	8,018	342,306	15,065	139,780	377,366	325,011	52,355	733	1,340
All species	942,881	10,698	12,529	28,697	1,270	10,143	17,284	346,605	15,065	141,800	379,387	326,955	52,432	733	1,386

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[1] International 1/4-inch rule.

Table 44A. -- Average annual net growth of sawtimber (Doyle rule) on timberland by species group and forest type group/local type, Indiana, 1986-1997

(In thousand board feet) [1]

Species group	All types	Forest type group/local type													
		White-red-jack pine	Loblolly-shortleaf pine	Oak-pine				Oak-hickory	Oak-gum-cypress	Elm-ash-cottonwood	Maple-beech-birch			Aspen-birch	Non-stocked
		White pine	Shortleaf-Virginia pine	Total	Eastern redcedar	Eastern redcedar-hardwood	Oak-pine	Oak-hickory	Oak-gum-cypress	Elm-ash-cottonwood	Total	Maple-beech	Cherry-ash-yellow poplar	Aspen-birch	Non-stocked
Softwoods															
Jack pine	209	--	--	161	--	--	161	--	--	28	20	20	--	--	--
Red pine	246	172	--	51	--	--	51	-11	--	--	34	34	--	--	--
White pine	6,593	3,559	119	1,857	--	18	1,839	822	--	80	140	140	--	--	16
Shortleaf pine	2,763	131	1,733	582	--	179	403	145	--	--	164	146	18	--	--
Virginia pine	4,927	152	2,544	1,523	--	301	1,223	524	--	-36	220	211	9	--	--
Baldcypress	683	--	--	--	--	--	--	--	--	683	--	--	--	--	--
Eastern redcedar	1,922	--	51	1,016	112	823	81	415	--	91	348	344	4	--	--
Other softwoods	129	--	--	--	--	--	--	25	--	104	--	--	--	--	--
Total	17,471	4,013	4,447	5,190	112	1,321	3,757	1,920	--	949	928	896	32	--	16
Hardwoods															
Select white oak	51,672	88	--	785	--	373	412	34,957	421	2,094	13,127	11,463	1,664	--	0
Other white oak	7,708	--	--	8	8	--	--	7,099	--	7	572	572	--	--	22
Select red oak	36,489	--	170	129	--	136	-8	22,392	136	875	12,049	11,597	452	--	343
Other red oak	51,550	46	49	1,585	122	542	922	33,002	4,302	3,233	8,818	7,727	1,091	--	179
Select hickory	17,108	--	13	128	--	83	45	10,934	78	472	5,398	5,350	48	16	--
Other hickory	27,102	--	56	262	43	161	59	17,237	--	762	8,620	7,952	669	--	--
Basswood	5,216	--	--	--	--	--	--	1,502	--	827	2,887	2,698	188	--	--
Beech	18,876	--	--	--	--	--	--	4,115	--	1,214	13,475	13,283	192	--	--
Yellow birch	95	--	--	--	--	--	--	--	--	95	--	--	--	--	--
Hard maple	43,986	--	31	681	48	492	141	9,367	--	1,722	32,054	31,278	777	18	--
Soft maple	30,962	76	68	230	--	230	--	4,132	1,143	17,568	7,670	6,047	1,623	--	--
Elm	7,645	--	--	--	--	--	--	1,377	70	1,300	5,069	4,714	355	--	0
Black ash	750	69	--	--	--	--	--	139	--	212	330	330	--	--	--
White & green ash	38,221	146	4	509	55	414	40	8,427	73	7,474	21,269	16,875	4,395	34	31
Sycamore	30,734	276	144	174	--	19	155	2,660	825	14,381	12,167	10,968	1,199	--	--
Cottonwood	19,104	46	3	613	--	--	613	1,953	245	14,248	1,976	1,166	810	--	--
Willow	869	--	--	--	--	--	--	357	--	264	236	347	-111	--	--
Hackberry	5,500	0	--	40	--	40	--	357	54	3,445	1,584	1,281	303	--	--
Bigtooth aspen	2,232	--	--	--	--	--	--	1,122	--	57	840	780	61	179	--
Quaking aspen	194	--	--	--	--	--	--	9	11	114	60	--	60	--	--
River birch	674	--	--	132	--	--	132	0	54	413	50	50	--	--	25
Sweetgum	5,105	--	260	74	--	--	74	1,201	860	980	1,761	1,555	205	--	--
Tupelo	2,515	--	38	390	--	146	245	617	344	164	961	900	61	--	--
Black cherry	12,725	195	--	256	63	--	193	2,757	400	1,605	7,479	5,520	1,958	--	--
Black walnut	12,655	--	57	45	--	45	--	2,529	--	1,844	8,022	5,409	2,613	32	--
Butternut	175	--	--	--	--	--	--	38	--	--	137	137	--	--	--
Yellow-poplar	76,524	97	500	2,448	126	914	1,409	21,744	274	5,940	43,908	33,341	10,567	88	229
Other hardwoods	9,158	0	37	0	--	0	--	2,362	56	2,012	4,630	3,930	700	--	-24
Total	515,545	1,040	1,429	8,489	464	3,593	4,432	192,386	9,346	83,324	215,148	185,270	29,878	367	806
All species	533,016	5,052	5,876	13,680	577	4,915	8,188	194,306	9,346	84,272	216,076	186,167	29,910	367	822

All table cells without observations in the inventory sample are indicated by --. Cells with observations smaller than the precision reported in the table are shown as zero. Columns and rows may not add to their totals due to rounding.

[1] Doyle rule.

Table 45. -- Current annual net growth of growing stock on timberland by species group and forest type group/local type, Indiana, 1997

(In thousand cubic feet)

Species group	All types	Forest type group/local type													
		White-red-jack pine	Loblolly-shortleaf pine	Oak-pine				Oak-hickory	Oak-gum-cypress	Elm-ash-cottonwood	Maple-beech-birch			Aspen-birch	Non-stocked
		White pine	Shortleaf-Virginia pine	Total	Eastern redcedar	Eastern redcedar-hardwood	Oak-pine	Oak-hickory	Oak-gum-cypress	Elm-ash-cottonwood	Total	Maple-beech	Cherry-ash-yellow poplar	Aspen-birch	Non-stocked
Softwoods															
Jack pine	107	--	1	87	--	--	87	--	--	11	8	8	--	--	--
Red pine	196	151	--	18	--	--	18	5	--	--	21	21	--	--	--
White pine	1,932	817	6	776	--	35	741	224	--	2	107	107	--	--	--
Shortleaf pine	959	56	652	191	--	36	155	31	--	8	22	22	--	--	--
Virginia pine	2,296	104	1,124	798	--	137	661	181	--	10	78	56	23	--	--
Baldcypress	117	--	--	--	--	--	--	--	--	117	--	--	--	--	--
Eastern redcedar	1,637	--	18	1,058	352	532	174	364	--	22	175	157	18	--	--
Other softwoods	88	12	--	25	--	--	25	4	--	18	28	15	13	--	--
Total	7,330	1,140	1,801	2,953	352	741	1,861	809	--	188	440	386	54	--	--
Hardwoods															
Select white oak	15,871	--	--	184	23	135	26	12,485	32	580	2,589	2,476	114	--	--
Other white oak	2,846	--	--	2	2	--	--	2,677	--	--	167	167	--	--	--
Select red oak	11,077	--	15	54	16	--	38	7,457	49	124	3,378	3,263	115	--	--
Other red oak	18,844	--	19	717	168	203	345	13,347	1,255	876	2,624	2,488	136	7	--
Select hickory	6,462	--	11	102	1	74	26	4,527	13	330	1,472	1,411	61	6	--
Other hickory	10,538	--	24	94	--	67	27	6,973	5	225	3,217	3,045	172	--	--
Basswood	2,018	--	--	5	--	5	--	423	--	201	1,389	1,365	24	--	--
Beech	4,106	--	--	1	--	--	1	971	5	78	3,051	3,038	13	--	--
Hard maple	19,200	6	57	188	--	149	39	4,627	--	368	13,944	13,548	396	10	--
Soft maple	15,212	56	58	218	--	102	116	2,548	131	7,799	4,347	4,075	272	56	--
Elm	7,377	38	17	102	3	29	70	1,306	98	1,662	4,154	3,500	654	--	--
Black ash	280	3	--	--	--	--	--	72	--	92	114	105	9	--	--
White & green ash	15,954	2	13	515	22	353	140	3,482	70	3,323	8,536	6,088	2,448	13	--
Sycamore	9,342	10	74	304	--	81	223	968	47	4,644	3,293	3,187	106	--	--
Cottonwood	4,923	26	--	357	--	--	357	96	192	3,677	573	499	74	--	--
Willow	538	--	--	--	--	--	--	--	12	456	70	39	31	--	--
Hackberry	2,488	4	--	16	--	16	--	213	20	1,080	1,155	1,045	110	--	--
Bigtooth aspen	992	--	--	24	--	24	--	426	--	86	359	344	16	96	--
Quaking aspen	162	--	--	--	--	--	--	27	10	20	62	--	62	43	--
River birch	1,162	51	--	364	--	--	364	85	--	619	42	42	--	--	--
Sweetgum	3,024	--	--	88	--	10	77	672	590	562	1,112	1,059	53	--	--
Tupelo	1,187	2	4	24	--	7	17	587	71	123	377	341	36	--	--
Black cherry	6,396	31	60	246	46	70	130	1,119	16	788	4,135	1,868	2,267	--	--
Black walnut	4,920	23	19	36	11	25	--	662	9	850	3,314	2,094	1,220	7	--
Butternut	73	--	5	--	--	--	--	10	--	--	58	58	--	--	--
Yellow-poplar	31,666	64	224	976	73	196	707	7,805	99	2,282	20,176	14,444	5,732	39	--
Other hardwoods	7,814	22	53	224	19	167	37	3,023	38	1,849	2,590	2,203	387	14	--
Total	204,472	337	652	4,842	385	1,715	2,743	76,587	2,764	32,697	86,300	71,791	14,509	293	--
All species	211,802	1,477	2,453	7,794	736	2,455	4,603	77,396	2,764	32,885	86,740	72,177	14,563	293	--

All table cells without observations in the inventory sample are indicated by --. Cells with observations smaller than the precision reported in the table are shown as zero. Columns and rows may not add to their totals due to rounding.

Table 46. -- Current annual net growth of sawtimber (International 1/4-inch rule) on timberland by species group and forest type group/local type, Indiana, 1997

(In thousand board feet) [1]

Species group	All types	Forest type group/local type														
		White-red-jack pine	Loblolly-shortleaf pine	Oak-pine				Oak-hickory	Oak-gum-cypress	Elm-ash-cottonwood	Maple-beech-birch			Aspen-birch	Non-stocked
		White pine	Shortleaf-Virginia pine	Total	Eastern redcedar	Eastern redcedar-hardwood	Oak-pine	Oak-hickory	Oak-gum-cypress	Elm-ash-cottonwood	Total	Maple-beech	Cherry-ash-yellow poplar	Aspen-birch	Non-stocked
Softwoods															
Jack pine	422	--	0	319	--	--	319	--	--	61	43	43	--	--	--
Red pine	571	444	--	27	--	--	27	--	--	--	100	100	--	--	--
White pine	6,453	3,118	--	2,083	--	44	2,039	945	--	6	302	302	--	--	--
Shortleaf pine	4,007	237	2,855	707	--	179	528	110	--	39	60	60	--	--	--
Virginia pine	7,456	219	3,771	2,325	--	329	1,996	793	--	57	292	264	27	--	--
Baldcypress	562	--	--	--	--	--	--	--	--	562	--	--	--	--	--
Eastern redcedar	2,013	--	15	1,215	226	956	33	457	--	75	252	240	12	--	--
Other softwoods	43	--	--	35	--	--	35	--	--	8	--	--	--	--	--
Total	21,528	4,018	6,640	6,711	226	1,507	4,977	2,305	--	807	1,047	1,007	39	--	--
Hardwoods															
Select white oak	56,825	--	--	434	--	364	70	45,072	102	2,098	9,119	8,804	314	--	--
Other white oak	12,159	--	--	--	--	--	--	11,459	--	--	700	700	--	--	--
Select red oak	40,234	--	75	66	66	--	--	27,562	235	378	11,916	11,596	320	--	--
Other red oak	65,113	--	54	1,809	--	786	1,024	47,022	3,962	2,838	9,428	9,031	397	--	--
Select hickory	20,974	--	41	365	--	276	89	14,642	66	1,009	4,821	4,704	117	31	--
Other hickory	37,049	--	56	299	--	257	43	24,674	--	839	11,180	10,665	515	--	--
Basswood	6,153	--	--	--	--	--	--	1,239	--	310	4,603	4,603	--	--	--
Beech	13,321	--	--	--	--	--	--	2,022	--	281	11,018	11,018	--	--	--
Hard maple	46,105	--	76	339	--	297	41	8,942	--	912	35,789	35,007	782	47	--
Soft maple	33,896	246	74	46	--	--	46	4,084	354	20,170	8,922	8,354	567	--	--
Elm	8,330	--	--	51	--	--	51	1,216	62	1,648	5,354	4,804	549	--	--
Black ash	510	--	--	--	--	--	--	103	--	122	285	285	--	--	--
White & green ash	46,313	--	--	1,000	--	672	328	10,720	216	8,923	25,390	19,455	5,935	64	--
Sycamore	34,920	--	270	738	--	278	460	3,461	172	17,366	12,913	12,701	211	--	--
Cottonwood	20,486	113	--	1,641	--	--	1,641	333	1,025	15,637	1,738	1,537	201	--	--
Willow	1,074	--	--	--	--	--	--	--	--	761	313	178	135	--	--
Hackberry	5,491	--	--	59	--	59	--	414	--	2,612	2,406	2,202	204	--	--
Bigtooth aspen	3,710	--	--	--	--	--	--	1,661	--	343	1,293	1,211	82	413	--
Quaking aspen	236	--	--	--	--	--	--	35	16	82	102	--	102	--	--
River birch	1,865	--	--	379	--	--	379	--	--	1,361	126	126	--	--	--
Sweetgum	8,673	--	--	109	--	--	109	1,903	1,860	1,742	3,059	2,854	205	--	--
Tupelo	1,629	--	--	24	--	--	24	436	165	192	811	762	49	--	--
Black cherry	11,212	--	212	571	125	107	339	2,583	--	1,061	6,784	3,533	3,252	--	--
Black walnut	14,252	--	89	68	--	68	--	2,013	--	2,152	9,896	6,718	3,177	34	--
Butternut	199	--	--	--	--	--	--	49	--	--	150	150	--	--	--
Yellow-poplar	117,436	332	615	3,065	115	547	2,403	30,136	320	8,969	73,796	56,293	17,503	204	--
Other hardwoods	11,732	0	--	0	--	0	--	3,859	--	3,039	4,834	4,409	425	--	--
Total	619,895	690	1,563	11,061	305	3,711	7,045	245,641	8,557	94,846	256,743	221,701	35,042	793	--
All species	641,423	4,709	8,203	17,772	532	5,219	12,022	247,945	8,557	95,653	257,790	222,709	35,081	793	--

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[1] International 1/4-inch rule.

Table 46A. -- Current annual net growth of sawtimber (Doyle rule) on timberland by species group and forest type group/local type, Indiana, 1997

(In thousand board feet) [1]

Species group	All types	Forest type group/local type													
		White-red-jack pine	Loblolly-shortleaf pine	Oak-pine				Oak-hickory	Oak-gum-cypress	Elm-ash-cottonwood	Maple-beech-birch			Aspen-birch	Non-stocked
		White pine	Shortleaf-Virginia pine	Total	Eastern redcedar	Eastern redcedar-hardwood	Oak-pine	Oak-hickory	Oak-gum-cypress	Elm-ash-cottonwood	Total	Maple-beech	Cherry-ash-yellow poplar	Aspen-birch	Non-stocked
Softwoods															
Jack pine	190	--	0	144	--	--	144	--	--	21	26	26	--	--	--
Red pine	211	168	--	9	--	--	9	--	--	--	34	34	--	--	--
White pine	3,014	1,478	--	898	--	15	883	492	--	2	145	145	--	--	--
Shortleaf pine	1,767	111	1,281	295	--	86	209	38	--	14	29	29	--	--	--
Virginia pine	3,467	76	1,768	1,092	--	127	965	364	--	20	149	139	9	--	--
Baldcypress	378	--	--	--	--	--	--	--	--	378	--	--	--	--	--
Eastern redcedar	802	--	5	497	100	386	11	170	--	30	100	96	4	--	--
Other softwoods	15	--	--	12	--	--	12	--	--	3	--	--	--	--	--
Total	9,845	1,832	3,054	2,947	100	615	2,232	1,063	--	468	482	468	14	--	--
Hardwoods															
Select white oak	33,817	--	--	233	--	194	39	26,759	53	1,186	5,585	5,352	233	--	--
Other white oak	7,056	--	--	--	--	--	--	6,663	--	--	392	392	--	--	--
Select red oak	24,946	--	31	28	28	--	--	17,075	141	225	7,446	7,270	176	--	--
Other red oak	39,163	--	23	1,047	--	433	614	27,905	2,645	1,708	5,835	5,605	230	--	--
Select hickory	10,749	--	17	181	--	129	52	7,446	31	537	2,520	2,464	56	18	--
Other hickory	19,340	--	27	158	--	130	28	12,634	--	441	6,080	5,810	271	--	--
Basswood	3,539	--	--	--	--	--	--	659	--	168	2,711	2,711	--	--	--
Beech	7,982	--	--	--	--	--	--	1,188	--	129	6,665	6,665	--	--	--
Hard maple	24,376	--	47	174	--	150	24	4,473	--	481	19,176	18,792	384	24	--
Soft maple	19,033	114	31	19	--	--	19	2,242	171	11,471	4,985	4,617	368	--	--
Elm	4,175	--	--	33	--	--	33	547	26	840	2,729	2,480	249	--	--
Black ash	238	--	--	--	--	--	--	48	--	51	139	139	--	--	--
White & green ash	24,857	--	--	526	--	349	177	5,555	124	4,752	13,874	10,781	3,092	27	--
Sycamore	22,495	--	153	338	--	133	204	2,062	80	11,450	8,412	8,273	139	--	--
Cottonwood	14,204	58	--	872	--	--	872	270	636	11,105	1,264	1,132	132	--	--
Willow	569	--	--	--	--	--	--	--	--	409	160	91	69	--	--
Hackberry	3,014	--	--	25	--	25	--	238	--	1,446	1,305	1,186	119	--	--
Bigtooth aspen	1,933	--	--	--	--	--	--	872	--	159	685	637	48	217	--
Quaking aspen	115	--	--	--	--	--	--	15	13	34	52	--	52	--	--
River birch	857	--	--	158	--	--	158	--	--	646	52	52	--	--	--
Sweetgum	4,565	--	--	45	--	--	45	953	944	909	1,714	1,603	110	--	--
Tupelo	813	--	--	12	--	--	12	218	81	104	398	376	22	--	--
Black cherry	5,801	--	118	244	52	45	147	1,413	--	528	3,498	1,879	1,619	--	--
Black walnut	7,290	--	37	28	--	28	--	1,061	--	1,102	5,047	3,496	1,551	14	--
Butternut	89	--	--	--	--	--	--	20	--	--	68	68	--	--	--
Yellow-poplar	68,771	217	379	1,795	86	290	1,418	17,840	160	5,341	42,928	32,899	10,028	112	--
Other hardwoods	5,874	0	--	0	--	0	--	1,802	--	1,602	2,469	2,271	198	--	--
Total	355,659	389	864	5,917	166	1,906	3,845	139,958	5,106	56,824	146,189	127,043	19,146	412	--
All species	365,504	2,221	3,917	8,864	266	2,521	6,077	141,020	5,106	57,292	146,671	127,511	19,159	412	--

All table cells without observations in the inventory sample are indicated by --. Cells with observations smaller than the precision reported in the table are shown as zero. Columns and rows may not add to their totals due to rounding.

[1] Doyle rule.

Table 47. -- Current annual net growth, current annual mortality, and current annual removals of growing stock and sawtimber (International 1/4-inch rule) on timberland by species group, Indiana, 1997

	Growing stock			Sawtimber		
Species group	Current annual net growth[1] 1997	Current annual mortality 1997	Current annual removals[2] 1997	Current annual net growth[1] 1997	Current annual mortality 1997	Current annual removals[2] 1997
	(In thousand cubic feet)			(In thousand board feet)[3]		
Softwoods						
Red pine	196	133	30	571	296	158
White pine	1,932	913	35	6,453	3,579	185
Shortleaf pine	959	434	352	4,007	1,340	1,798
Virginia pine	2,296	569	--	7,456	1,975	--
Eastern redcedar	1,637	483	191	2,013	1,640	686
Other softwoods	312	290	945	1,028	867	3,826
Total softwoods	7,330	2,822	1,551	21,528	9,697	6,652
Hardwoods						
Select white oak	15,871	5,847	12,787	56,825	21,864	65,073
Other white oak	2,846	3,250	1,967	12,159	15,006	10,212
Select red oak	11,077	4,809	9,897	40,234	19,441	50,071
Other red oak	18,844	9,108	13,591	65,113	34,398	67,819
Select hickory	6,462	3,101	3,493	20,974	10,783	14,490
Other hickory	10,538	3,799	3,103	37,049	14,101	14,160
Basswood	2,018	925	963	6,153	3,317	5,155
Beech	4,106	2,005	2,579	13,321	7,087	12,159
Hard maple	19,200	9,320	6,232	46,105	36,345	28,387
Soft maple	15,212	4,490	4,687	33,896	13,178	21,207
Elm	7,377	9,795	1,029	8,330	25,432	4,051
Black ash	280	71	296	510	146	1,477
White & green ash	15,954	8,821	8,087	46,313	29,704	37,862
Sycamore	9,342	3,036	3,271	34,920	12,270	15,787
Cottonwood	4,923	3,894	2,102	20,486	17,779	10,822
Hackberry	2,488	1,688	493	5,491	6,159	2,057
River birch	1,162	397	--	1,865	687	--
Sweetgum	3,024	1,211	961	8,673	3,480	4,012
Tupelo	1,187	454	131	1,629	1,364	673
Black cherry	6,396	3,614	2,806	11,212	9,552	13,640
Black walnut	4,920	1,252	2,614	14,252	3,391	12,756
Butternut	73	25	--	199	61	--
Yellow-poplar	31,666	3,409	14,447	117,436	12,675	73,734
Other hardwoods	9,507	6,853	2,554	16,751	13,193	7,581
Total hardwoods	204,472	91,176	98,093	619,895	311,414	473,188
All species	211,802	93,998	99,644	641,423	321,111	479,841

All table cells without observations in the inventory sample are indicated by --. Cells with observations smaller than the precision reported in the table are shown as zero. Columns and rows may not add to their totals due to rounding.

[1] An estimate of current gross growth may be computed by adding current mortality to current net growth.

[2] Based on data from a 1995 pulpwood survey, a 1994 survey of other primary wood using mills, a 1994 residential fuelwood survey, regional logging utilization studies, and land-use change estimates from the new inventory.

[3] International 1/4-inch rule.

Table 47A. -- Current annual net growth, current annual mortality, and current annual removals of growing stock and sawtimber (Doyle rule) on timberland by species group, Indiana, 1997

	Growing stock			Sawtimber		
Species group	Current annual net growth[1] 1997	Current annual mortality 1997	Current annual removals[2] 1997	Current annual net growth[1] 1997	Current annual mortality 1997	Current annual removals[2] 1997
	(In thousand cubic feet)			(In thousand board feet)[3]		
Softwoods						
Red pine	196	133	30	211	111	107
White pine	1,932	913	35	3,014	1,620	126
Shortleaf pine	959	434	352	1,767	592	1,223
Virginia pine	2,296	569	--	3,467	1,061	--
Eastern redcedar	1,637	483	191	802	803	467
Other softwoods	312	290	945	584	384	2,602
Total softwoods	7,330	2,822	1,551	9,845	4,572	4,523
Hardwoods						
Select white oak	15,871	5,847	12,787	33,817	16,639	44,250
Other white oak	2,846	3,250	1,967	7,056	9,040	6,944
Select red oak	11,077	4,809	9,897	24,946	15,356	34,048
Other red oak	18,844	9,108	13,591	39,163	22,892	46,117
Select hickory	6,462	3,101	3,493	10,743	6,155	9,853
Other hickory	10,538	3,799	3,103	19,340	8,737	9,629
Basswood	2,018	925	963	3,539	1,910	3,505
Beech	4,106	2,005	2,579	7,982	5,331	8,268
Hard maple	19,200	9,320	6,232	24,376	22,283	19,303
Soft maple	15,212	4,490	4,687	19,033	9,141	14,421
Elm	7,377	9,795	1,029	4,160	14,320	2,755
Black ash	280	71	296	238	78	1,004
White & green ash	15,954	8,821	8,087	24,857	18,176	25,746
Sycamore	9,342	3,036	3,271	22,495	9,633	10,735
Cottonwood	4,923	3,894	2,102	14,204	14,190	7,359
Hackberry	2,488	1,688	493	3,014	4,137	1,399
River birch	1,162	397	--	857	331	--
Sweetgum	3,024	1,211	961	4,565	2,058	2,728
Tupelo	1,187	454	131	813	810	458
Black cherry	6,396	3,614	2,806	5,801	5,411	9,275
Black walnut	4,920	1,252	2,614	7,290	1,688	8,674
Butternut	73	25	--	89	27	--
Yellow-poplar	31,666	3,409	14,447	68,771	8,217	50,139
Other hardwoods	9,507	6,853	2,554	8,490	6,581	5,155
Total hardwoods	204,472	91,176	98,093	355,637	203,139	321,768
All species	211,802	93,998	99,644	365,482	207,711	326,292

All table cells without observations in the inventory sample are indicated by --. Cells with observations smaller than the precision reported in the table are shown as zero. Columns and rows may not add to their totals due to rounding.

[1] An estimate of current gross growth may be computed by adding current mortality to current net growth.

[2] Based on data from a 1995 pulpwood survey, a 1994 survey of other primary wood using mills, a 1994 residential fuelwood survey, regional logging utilization studies, and land-use change estimates from the new inventory.

[3] Doyle rule.

Table 48. -- Average annual removals for 1966 to 1986 and 1986 to 1997, and current annual removals for 1993 from growing stock and sawtimber (International 1/4-inch rule) on timberland by Forest Survey Unit and softwoods and hardwoods, Indiana

Forest Survey Unit and softwoods and hardwoods	Growing stock			Sawtimber		
	Average annual removals	Average annual removals	Current annual removals	Average annual removals	Average annual removals	Current annual removals
	1966-1986[1]	1986-1997[1]	1997[2]	1966-1986[1]	1986-1997[1]	1997[2]
	(In thousand cubic feet)			(In thousand board feet)[3]		
Lower Wabash Unit						
Softwoods	787	--	2	4,253	--	8
Hardwoods	16,147	21,855	25,869	70,771	88,105	119,226
Total	16,934	21,855	25,871	75,024	88,105	119,234
Knobs Unit						
Softwoods	306	440	1,170	1,037	972	4,813
Hardwoods	30,994	38,582	34,986	130,525	171,412	175,029
Total	31,300	39,023	36,157	131,562	172,384	179,842
Upland Flats Unit						
Softwoods	70	43	319	--	--	1,675
Hardwoods	4,577	9,884	8,535	21,825	43,963	40,034
Total	4,647	9,926	8,855	21,825	43,963	41,708
Northern Unit						
Softwoods	19	23	60	--	--	157
Hardwoods	19,690	17,395	28,703	85,630	71,168	138,899
Total	19,709	17,417	28,763	85,630	71,168	139,056
All Units						
Softwoods	1,182	505	1,551	5,290	972	6,652
Hardwoods	71,408	87,716	98,093	308,751	374,647	473,188
Total	72,590	88,222	99,644	314,041	375,619	479,841

All table cells without observations in the inventory sample are indicated by --. Cells with observations smaller than the precision reported in the table are shown as zero. Columns and rows may not add to their totals due to rounding.

[1] Average of field plot level removals between the study periods.

[2] Based on data from mill surveys and regional logging utilization studies and land-use change estimates from the field inventory. The last year for a complete timber product output survey is 1993.

[3] International 1/4-inch rule.

Table 48A. -- Average annual removals for 1986 to 1997, and current annual removals for 1993 from growing stock and sawtimber (Doyle rule) on timberland by Forest Survey Unit and softwoods and hardwoods, Indiana

Forest Survey Unit and softwoods and hardwoods	Growing stock		Sawtimber	
	Average annual removals 1986-1997[1]	Current annual removals 1997[2]	Average annual removals 1986-1997[1]	Current annual removals 1997[2]
	(In thousand cubic feet)		(In thousand board feet)[3]	
Lower Wabash Unit				
Softwoods	--	2	--	5
Hardwoods	21,855	25,869	57,707	81,074
Total	21,855	25,871	57,707	81,079
Knobs Unit				
Softwoods	440	1,170	435	3,273
Hardwoods	38,582	34,986	115,736	119,019
Total	39,023	36,157	116,170	122,293
Upland Flats Unit				
Softwoods	43	319	--	1,139
Hardwoods	9,884	8,535	31,603	27,223
Total	9,926	8,855	31,603	28,361
Northern Unit				
Softwoods	23	60	--	107
Hardwoods	17,395	28,703	49,082	94,451
Total	17,417	28,763	49,082	94,558
All Units				
Softwoods	505	1,551	435	4,523
Hardwoods	87,716	98,093	254,128	321,768
Total	88,222	99,644	254,563	326,292

All table cells without observations in the inventory sample are indicated by --. Cells with observations smaller than the precision reported in the table are shown as zero. Columns and rows may not add to their totals due to rounding.

[1] Average of field plot level removals between the study periods.

[2] Based on data from mill surveys and regional logging utilization studies and land-use change estimates from the field inventory. The last year for a complete timber product output survey is 1993.

[3] Doyle rule.

Table 49. -- Average annual mortality for 1966 to 1986 and 1986 to 1997, and current annual mortality for 1997 of growing stock and sawtimber (International 1/4-inch rule) on timberland by Forest Survey Unit and softwoods and hardwoods, Indiana

Forest Survey Unit and softwoods and hardwoods	Growing stock			Sawtimber		
	Average annual mortality [1]	Average annual mortality	Current annual mortality	Average annual mortality [1]	Average annual mortality	Current annual mortality
	1966-1986	1986-1997	1997	1966-1986	1986-1997	1997
	(In thousand cubic feet)			(In thousand board feet)[2]		
Lower Wabash Unit						
Softwoods	--	354	347	--	548	1,194
Hardwoods	--	11,753	19,389	--	28,785	67,042
Total	--	12,107	19,736	--	29,333	68,235
Knobs Unit						
Softwoods	--	1,728	1,713	--	4,439	5,870
Hardwoods	--	19,943	32,622	--	50,730	115,136
Total	--	21,672	34,335	--	55,168	121,006
Upland Flats Unit						
Softwoods	--	109	120	--	368	369
Hardwoods	--	7,298	9,576	--	18,457	30,019
Total	--	7,408	9,696	--	18,826	30,388
Northern Unit						
Softwoods	--	605	643	--	254	2,264
Hardwoods	--	19,617	29,589	--	52,965	99,218
Total	--	20,222	30,232	--	53,220	101,481
All Units						
Softwoods	2,180	2,797	2,822	4,532	5,610	9,697
Hardwoods	35,345	58,612	91,176	96,717	150,937	311,414
Total	37,525	61,409	93,998	101,249	156,547	321,111

All table cells without observations in the inventory sample are indicated by --. Cells with observations smaller than the precision reported in the table are shown as zero. Columns and rows may not add to their totals due to rounding.

[1] Data are not available on a unit basis.

[2] International 1/4-inch rule.

Table 49A. -- Average annual mortality for 1986 to 1997, and current annual mortality for 1997 of growing stock and sawtimber (Doyle rule) on timberland by Forest Survey Unit and softwoods and hardwoods, Indiana

Forest Survey Unit and softwoods and hardwoods	Growing stock		Sawtimber	
	Average annual mortality	Current annual mortality	Average annual mortality	Current annual mortality
	1986-1997	1997	1986-1997	1997
	(In thousand cubic feet)		(In thousand board feet)[2]	
Lower Wabash Unit				
Softwoods	354	347	336	610
Hardwoods	11,753	19,389	18,016	45,009
Total	12,107	19,736	18,352	45,619
Knobs Unit				
Softwoods	1,728	1,713	2,158	2,856
Hardwoods	19,943	32,622	31,776	71,717
Total	21,672	34,335	33,934	74,573
Upland Flats Unit				
Softwoods	109	120	138	179
Hardwoods	7,298	9,576	12,163	19,022
Total	7,408	9,696	12,301	19,201
Northern Unit				
Softwoods	605	643	88	927
Hardwoods	19,617	29,589	37,326	67,391
Total	20,222	30,232	37,414	68,319
All Units				
Softwoods	2,797	2,822	2,719	4,572
Hardwoods	58,612	91,176	99,281	203,139
Total	61,409	93,998	102,000	207,711

All table cells without observations in the inventory sample are indicated by --. Cells with observations smaller than the precision reported in the table are shown as zero. Columns and rows may not add to their totals due to rounding.

[1] Data are not available on a unit basis.

[2] Doyle rule.

Table 50. -- Current annual timber removals of growing stock and sawtimber on timberland by species group, product, logging residue, and other removals, Indiana, 1997

Species group	Growing stock									Sawtimber								
		Removals for products (items)						Nonproduct removals			Removals for products (items)						Nonproduct removals	
	All removals	All product removals	Saw logs	Veneer logs	Pulp-wood	Fuel-wood	Misc. products	Logging residue	Other removals	All removals	All product removals	Saw logs	Veneer logs	Pulp-wood	Fuel-wood	Misc. products	Logging residue	Other removals
	(In thousand cubic feet)									(In thousand board feet, International 1/4-inch rule)								
Softwoods																		
Red pine	30	27	22	--	--	--	5	3	--	158	154	125	--	--	--	29	4	--
White pine	35	31	19	--	--	0	12	3	--	185	181	111	--	--	0	69	5	--
Shortleaf pine	352	300	283	--	17	0	--	31	21	1,798	1,654	1,631	--	23	0		43	101
Eastern redcedar	191	167	144	--	--	8	14	1	23	686	685	653	--	--	24	9	1	--
Other softwoods	945	849	543	--	290	16	--	62	34	3,826	3,569	3,124	--	399	46		83	174
Total softwoods	1,551	1,374	1,011	--	306	25	31	99	78	6,652	6,243	5,644	--	422	70	107	135	274
Hardwoods																		
Select white oak	12,787	9,331	7,615	726	312	456	222	2,447	1,009	65,073	52,948	44,673	5,308	467	1,162	1,338	7,860	4,265
Other white oak	1,967	1,505	1,120	196	50	78	61	382	80	10,212	8,677	6,573	1,435	114	192	364	1,228	307
Select red oak	9,897	6,931	6,298	226	134	270	4	1,918	1,048	50,071	39,531	36,945	1,651	211	699	25	6,179	4,361
Other red oak	13,591	9,736	8,652	298	426	353	7	2,633	1,222	67,819	54,411	50,755	2,181	525	910	40	8,482	4,926
Select hickory	3,493	1,816	1,455	42	179	140	--	462	1,215	14,490	9,903	8,869	305	289	440	--	1,293	3,295
Other hickory	3,103	1,785	1,432	7	201	146	--	449	869	14,160	9,541	8,726	50	306	458	--	1,251	3,369
Basswood	963	738	714	22	2	--	--	226	--	5,155	4,521	4,350	163	8	--	--	633	--
Beech	2,579	1,603	1,381	48	108	65	--	437	539	12,159	9,062	8,419	350	95	198	--	1,228	1,868
Hard maple	6,232	4,121	3,537	247	174	164	--	1,023	1,088	28,387	23,412	20,819	1,804	413	376	--	2,497	2,479
Soft maple	4,687	2,994	2,601	102	194	98	--	742	951	21,207	16,751	15,310	745	458	237	--	1,790	2,667
Elm	1,029	547	457	6	83	1	--	148	334	4,051	3,194	2,787	42	362	2	--	410	448
Black ash	296	238	184	8	11	35	--	59	--	1,477	1,312	1,118	57	22	115	--	164	--
White & green ash	8,087	5,150	4,180	166	197	607	--	1,333	1,605	37,862	29,004	25,475	1,212	473	1,845	--	3,740	5,118
Sycamore	3,271	1,778	1,455	211	112	--	--	484	1,009	15,787	10,507	8,867	1,543	98	--	--	1,395	3,885
Cottonwood	2,102	1,585	1,300	23	206	56	--	203	314	10,822	9,217	8,372	171	490	183	--	517	1,089
Hackberry	493	187	185	2	--	--	--	58	248	2,057	1,142	1,130	13	--	--	--	162	753
Sweetgum	961	509	421	88	--	--	--	144	308	4,012	3,208	2,565	643	--	--	--	420	383
Tupelo	131	80	80	--	--	--	--	25	27	673	485	485	--	--	--	--	69	119
Black cherry	2,806	1,876	1,421	284	--	171	--	485	445	13,640	11,297	8,660	2,076	--	560	--	1,411	933
Black walnut	2,614	1,535	1,211	244	--	80	--	135	944	12,756	9,842	7,863	1,734	--	245	--	509	2,405
Yellow-poplar	14,447	9,286	8,504	239	432	21	90	2,715	2,446	73,734	54,841	51,827	1,749	678	37	549	7,615	11,279
Sassafras	972	312	192	21	--	99	--	63	597	2,984	1,649	1,170	156	--	323	--	180	1,155
Other hardwoods	1,582	1,042	72	4	81	700	185	30	510	4,597	3,654	435	28	351	2,294	544	68	877
Total hardwoods	98,093	64,685	54,464	3,210	2,901	3,539	569	16,600	16,808	473,188	368,108	326,193	23,416	5,362	10,278	2,860	49,100	55,981
All species	99,644	66,059	55,476	3,210	3,208	3,564	601	16,699	16,886	479,841	374,351	331,837	23,416	5,783	10,348	2,967	49,235	56,255

All table cells without observations are indicated by --. Cells with observations smaller than the precision reported in the table are shown as zero. Columns and rows may not add to their totals due to rounding.

Removals data are based on the Indiana 1995 Timber Products Output study, the 1997 Pulpwood study, and the 1996 Fuelwood study.

The average date of the data is 1996.

Table 51. -- Total volume of wood fiber used for each primary product by softwoods and hardwoods, and source of material, Indiana, 1997

Product by softwoods and hardwoods	Standard units	Total		Roundwood products				Plant byproducts	
				Growing stock		Non-growing stock			
		Number of units	Thousand cubic feet [1]	Number of units	Thousand cubic feet	Number of units	Thousand cubic feet	Number of units	Thousand cubic feet
Saw logs									
Softwoods	Thousand board feet [1]	5,678	1,013	5,669	1,011	9	2	--	--
Hardwoods		348,150	57,984	326,726	54,464	21,425	3,520	--	--
Total		353,829	58,998	332,395	55,476	21,434	3,522	--	--
Veneer logs									
Softwoods	Thousand board feet [1]	--	--	--	--	--	--	--	--
Hardwoods		23,670	3,246	23,416	3,210	255	36	--	--
Total		23,670	3,246	23,416	3,210	255	36	--	--
Pulpwood [2]									
Softwoods	Standard cords [3]	3,991	315	3,878	306	75	6	37	3
Hardwoods		204,321	16,141	36,727	2,901	11,905	941	155,689	12,299
Total		208,312	16,457	40,606	3,208	11,980	946	155,726	12,302
Fuelwood									
Softwoods	Standard cords [3]	8,386	587	357	25	7,820	547	208	15
Hardwoods		676,651	47,366	50,555	3,539	463,944	32,476	162,153	11,351
Total		685,037	47,953	50,912	3,564	471,764	33,023	162,361	11,365
Miscellaneous products									
Softwoods	Thousand cubic feet	117	117	31	31	7	7	79	79
Hardwoods		20,894	20,894	569	569	161	161	20,164	20,164
Total		21,012	21,012	601	601	168	168	20,243	20,243
All products									
Softwoods	Thousand cubic feet		2,033		1,374		562		97
Hardwoods			145,632		64,685		37,133		43,814
Total			147,665		66,059		37,696		43,910

[1] International 1/4-inch rule.

[2] Includes roundwood for wood pulp, and plant byproducts for wood pulp, chip board, wafer board, particle board, engineered lumber, etc.

[3] 128 cubic feet; includes wood, bark, and air space.

All table cells without observations are indicated by --. Cells with observations smaller than the precision reported in the table are shown as zero. Columns and rows may not add to their totals due to rounding.

Removals data are based on the Indiana 1995 Timber Products Output study, the 1997 Pulpwood study, and the 1996 Fuelwood study. The average date of the data is 1996.

Table 52. -- Output of roundwood products by product, softwoods and hardwoods, and source of material, Indiana, 1997

(In thousand cubic feet)

Product by softwoods and hardwoods	All sources	Growing stock			Non-growing stock
		Total	Sawtimber	Poletimber	
Saw logs					
Softwoods	1,013	1,011	1,011	--	2
Hardwoods	57,984	54,464	54,464	--	3,520
Total	58,998	55,476	55,476	--	3,522
Veneer logs					
Softwoods	--	--	--	--	--
Hardwoods	3,246	3,210	3,210	--	36
Total	3,246	3,210	3,210	--	36
Pulpwood					
Softwoods	312	306	81	225	6
Hardwoods	3,843	2,902	1,161	1,741	941
Total	4,154	3,208	1,242	1,966	946
Fuelwood					
Softwoods	572	25	16	9	547
Hardwoods	36,014	3,538	2,167	1,371	32,476
Total	36,587	3,564	2,183	1,381	33,023
Miscellaneous products					
Softwoods	38	31	21	10	7
Hardwoods	730	569	514	55	161
Total	769	601	535	65	168
All products					
Softwoods	1,936	1,374	1,129	245	562
Hardwoods	101,818	64,685	61,517	3,168	37,133
Total	103,754	66,059	62,646	3,413	37,696

All table cells without observations are indicated by --. Cells with observations smaller than the precision reported in the table are shown as zero. Columns and rows may not add to their totals due to rounding.
Removals data are based on the Indiana 1995 Timber Products Output study, the 1997 Pulpwood study, and the 1996 Fuelwood study. The average date of the data is 1996.

Table 53. -- Timber products from roundwood by species group and product, Indiana, 1997

Species group	All products	Saw logs		Veneer logs		Pulpwood		Fuelwood		Misc. products
	Thousand cubic feet	Thousand board feet [1]	Thousand cubic feet	Thousand board feet [1]	Thousand cubic feet	Standard cords [2]	Thousand cubic feet	Standard cords [2]	Thousand cubic feet	Thousand cubic feet
Softwoods										
Red pine	27	125	22	--	--	--	--	--	--	5
White pine	31	111	19	--	--	--	--	2	0	12
Shortleaf pine	301	1,633	284	--	--	214	17	1	0	--
Eastern redcedar	271	681	145	--	--	--	--	1,490	104	21
Other softwoods	1,307	3,128	543	--	--	3,739	295	6,684	468	--
Total softwoods	1,936	5,678	1,013	--	--	3,953	312	8,178	572	38
Hardwoods										
Select white oak	15,655	48,379	8,186	5,308	726	5,120	404	87,050	6,093	246
Other white oak	2,352	7,119	1,204	1,435	196	851	67	11,680	818	67
Select red oak	10,923	40,010	6,770	1,651	226	2,208	174	53,556	3,749	5
Other red oak	14,878	54,966	9,300	2,181	298	6,893	545	67,535	4,727	7
Select hickory	3,676	9,316	1,531	305	42	2,954	233	26,713	1,870	--
Other hickory	3,485	9,166	1,506	50	7	3,301	261	24,455	1,712	--
Basswood	776	4,570	751	163	22	35	3	--	--	--
Beech	2,088	8,843	1,453	350	48	1,713	135	6,452	452	--
Hard maple	5,583	21,912	3,732	1,804	247	3,004	237	19,532	1,367	--
Soft maple	3,839	16,114	2,744	745	102	3,348	264	10,402	728	--
Elm	3,932	2,928	481	42	6	1,594	126	47,415	3,319	--
Black ash	433	1,175	193	57	8	191	15	3,098	217	--
White & green ash	8,827	26,759	4,396	1,212	166	3,404	269	57,086	3,996	--
Sycamore	1,881	9,314	1,530	1,543	211	1,770	140	--	--	--
Cottonwood	1,767	8,494	1,318	171	23	3,563	281	2,056	144	--
Hackberry	288	1,187	195	13	2	--	--	1,297	91	--
Sweetgum	531	2,694	443	643	88	--	--	--	--	--
Tupelo	84	510	84	--	--	--	--	--	--	--
Black cherry	3,222	9,097	1,495	2,076	284	--	--	20,613	1,443	--
Black walnut	2,169	9,473	1,450	1,988	280	--	--	6,264	439	--
Yellow-poplar	10,721	54,440	8,945	1,749	239	7,131	563	12,557	879	95
Sassafras	1,447	1,229	202	156	21	--	--	17,490	1,224	--
Other hardwoods	3,054	457	75	28	4	1,553	122	36,282	2,540	311
Noncommercial species	208	--	--	--	--	--	--	2,966	208	--
Total hardwoods	101,818	348,150	57,984	23,670	3,246	48,633	3,842	514,499	36,015	730
All species	103,754	353,829	58,998	23,670	3,246	52,586	4,154	522,676	36,587	769

[1] International 1/4-inch rule.

[2] 128 cubic feet; includes wood, bark, and air space

All table cells without observations are indicated by --. Cells with observations smaller than the precision reported in the table are shown as zero. Columns and rows may not add to their totals due to rounding.

Removals data are based on the Indiana 1995 Timber Products Output study, the 1997 Pulpwood study, and the 1996 Fuelwood study. The average date of the data is 1996.

Table 54. -- All live tree biomass on timberland by species group and forest type group/local type, Indiana, 1998

(In green tons)

Species group	All types	Forest type group/local type													
		White-red-jack pine	Loblolly-shortleaf pine	Oak-pine				Oak-hickory	Oak-gum-cypress	Elm-ash-cottonwood	Maple-beech-birch			Aspen-birch	Non-stocked
		White pine	Shortleaf-Virginia pine	Total	Eastern redcedar	Eastern redcedar-hardwood	Oak-pine	Oak-hickory	Oak-gum-cypress	Elm-ash-cottonwood	Total	Maple-beech	Cherry-ash-yellow poplar	Aspen-birch	Non-stocked
Softwoods															
Jack pine	179	--	47	112	--	--	112	--	--	10	11	11	--	--	--
Red pine	395	354	--	19	--	--	19	10	--	--	12	12	--	--	--
White pine	2,387	1,176	2	761	--	19	742	310	--	23	114	114	--	--	--
Shortleaf pine	1,534	101	1,070	290	--	56	234	39	--	7	28	28	--	--	--
Virginia pine	2,942	170	1,492	924	--	127	797	226	--	20	110	84	27	--	--
Baldcypress	152	--	--	--	--	--	--	--	--	152	--	--	--	--	--
Eastern redcedar	3,031	--	33	1,882	679	1,129	74	624	18	72	401	363	38	--	--
Other softwoods	217	25	--	75	--	--	75	3	--	72	43	23	21	--	--
White pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	10,837	1,826	2,643	4,063	679	1,331	2,053	1,212	18	356	719	634	85	--	--
Hardwoods															
Select white oak	40,192	--	--	361	44	271	46	31,803	87	1,400	6,541	5,942	599	--	--
Other white oak	6,989	--	14	7	7	--	--	6,558	--	--	411	411	--	--	--
Select red oak	21,054	--	18	66	23	--	43	14,340	87	185	6,358	6,108	250	--	--
Other red oak	35,276	--	38	963	167	263	533	25,712	2,253	1,484	4,824	4,607	217	2	--
Select hickory	16,331	--	24	225	2	167	56	11,521	42	796	3,688	3,356	332	34	--
Other hickory	21,315	6	32	248	--	202	46	13,793	9	445	6,781	6,443	338	--	--
Basswood	3,279	--	--	4	--	4	--	563	--	396	2,316	2,298	18	--	--
Beech	13,191	--	1	69	6	1	62	2,480	6	281	10,354	10,328	25	--	--
Yellow birch	16	--	--	--	--	--	--	--	--	16	--	--	--	--	--
Hard maple	43,499	10	161	442	1	382	59	9,899	1	931	32,038	31,139	900	17	--
Soft maple	22,422	50	118	261	--	140	121	2,978	138	12,697	6,135	5,248	887	44	--
Elm	12,111	68	34	230	20	128	82	1,978	85	2,853	6,863	5,856	1,008	--	--
Black ash	520	19	--	--	--	--	--	102	--	218	182	173	8	--	--
White & green ash	24,753	20	19	977	41	746	190	5,287	136	4,668	13,632	9,983	3,649	14	--
Sycamore	15,045	6	98	313	--	87	226	1,434	45	8,046	5,103	4,895	208	--	--
Cottonwood	7,353	36	--	277	--	--	277	231	177	6,099	532	456	76	--	--
Willow	1,046	--	--	--	--	--	--	38	3	844	161	106	56	--	--
Hackberry	4,747	7	1	26	3	22	--	494	19	2,270	1,931	1,694	237	--	--
Bigtooth aspen	1,453	--	--	17	--	17	--	653	--	99	547	520	27	138	--
Quaking aspen	173	--	--	--	--	--	--	30	28	16	64	--	64	35	--
River birch	1,219	44	--	290	--	--	290	89	--	735	62	62	--	--	--
Sweetgum	4,584	--	1	191	--	53	138	1,140	739	870	1,643	1,566	76	--	--
Tupelo	3,338	3	7	119	--	31	88	1,375	249	434	1,151	1,028	123	--	--
Black cherry	9,500	30	100	299	65	96	139	2,303	18	1,057	5,685	2,707	2,979	7	--
Black walnut	9,380	23	31	72	14	58	--	1,444	8	1,539	6,252	3,760	2,492	11	--
Butternut	149	--	7	--	--	--	--	25	--	13	104	104	--	--	--
Yellow-poplar	32,129	292	225	925	72	171	683	8,334	84	2,378	19,854	14,373	5,480	39	--
Other hardwoods	18,619	93	134	833	83	447	303	7,123	62	4,431	5,924	4,991	933	20	--
Tupelo	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	369,685	707	1,062	7,215	548	3,285	3,382	151,729	4,274	55,200	149,137	128,154	20,983	361	--
All species	384,591	2,534	3,709	11,501	1,248	4,808	5,445	153,651	4,446	56,481	151,907	130,577	21,331	361	--

All table cells without observations in the inventory sample are indicated by --. Cells with observations smaller than the precision reported in the table are shown as zero. Columns and rows may not add to their totals due to rounding.

Table 55. -- All live aboveground tree biomass on timberland by species group and tree biomass component, Indiana, 1998

(In green tons)

Species group	All components	Tree biomass component						
		All live 1-5 inch trees	Growing-stock trees			Non-growing-stock trees		
			Stumps	Boles	Tops and limbs	Stumps	Boles	Tops and limbs
Total softwoods								
Jack pine	179	--	10	137	16	1	14	2
Red pine	395	7	26	324	39	--	--	--
White pine	2,387	54	138	1,925	213	4	47	5
Shortleaf pine	1,534	5	83	1,254	142	3	41	5
Virginia pine	2,942	87	156	2,334	267	6	83	10
Baldcypress	152	--	8	115	26	0	2	1
Eastern redcedar	3,031	798	139	1,202	365	41	378	107
Other softwoods	217	14	15	139	41	1	6	2
Total	10,837	966	575	7,431	1,107	55	570	131
Total hardwoods								
Select white oak	40,192	733	2,126	27,084	7,154	182	2,342	571
Other white oak	6,989	54	410	4,929	1,337	17	187	55
Select red oak	21,054	440	929	14,603	3,736	64	1,026	255
Other red oak	35,276	881	1,625	23,468	6,235	152	2,340	575
Select hickory	16,331	709	785	10,566	3,177	55	812	227
Other hickory	21,315	641	987	14,187	4,151	67	1,005	277
Basswood	3,279	207	138	1,763	506	35	506	126
Beech	13,191	604	396	5,251	1,417	270	4,275	978
Yellow birch	16	16	--	--	--	--	--	--
Hard maple	43,499	4,404	1,667	23,859	7,134	300	4,851	1,285
Soft maple	22,422	1,947	758	11,001	3,193	262	4,151	1,109
Elm	12,111	2,601	580	5,182	1,692	163	1,421	472
Black ash	520	102	24	222	72	6	73	20
White & green ash	24,753	1,350	1,058	14,716	4,284	184	2,435	725
Sycamore	15,045	159	539	9,929	2,567	77	1,415	361
Cottonwood	7,353	106	359	5,335	1,246	17	232	58
Willow	1,046	34	35	396	118	31	329	104
Hackberry	4,747	562	241	2,423	728	57	568	168
Bigtooth aspen	1,453	59	57	1,072	236	1	22	6
Quaking aspen	173	7	8	123	30	0	3	1
River birch	1,219	114	65	724	244	4	52	16
Sweetgum	4,584	260	241	2,998	901	10	136	38
Tupelo	3,338	581	148	1,678	530	25	287	89
Black cherry	9,500	1,076	362	4,212	1,309	159	1,818	565
Black walnut	9,380	282	462	5,517	1,653	88	1,065	313
Butternut	149	--	5	63	20	4	42	14
Yellow-poplar	32,129	880	1,300	22,596	6,132	52	937	234
Other hardwoods	18,619	4,060	553	5,901	1,935	393	4,391	1,387
Total	369,685	22,868	15,857	219,799	61,735	2,677	36,720	10,030
Noncommercial species	4,069	2,058	--	--	--	147	1,379	485
All species	384,591	25,893	16,432	227,230	62,842	2,879	38,669	10,646

All table cells without observations in the inventory sample are indicated by --. Cells with observations smaller than the precision reported in the table are shown as zero. Columns and rows may not add to their totals due to rounding.

Table 56. -- Sampling errors [1] by Forest Survey Unit and county/county group for area of timberland, volume, average annual net growth, and average annual removals on timberland, Indiana, 1998

(Sampling error in percent)

Forest Survey Unit and county/county group	Forest Area	Timberland Area	Growing stock			Sawtimber		
			Volume	Average annual net growth	Average annual removals	Volume	Average annual net growth	Average annual removals
Lower Wabash Unit								
Clay	15.06	15.06	18.51	18.28	64.58	19.36	18.54	71.33
Daviess, Knox	17.28	18.54	24.60	23.72	41.97	26.18	23.57	45.59
Gibson	13.38	13.38	21.67	22.35	--	24.17	32.44	--
Greene	7.83	7.83	10.17	10.45	48.15	12.66	10.64	45.51
Martin	7.88	8.24	12.50	12.92	55.84	13.45	12.25	56.60
Parke	8.13	8.94	12.99	11.79	40.24	14.64	12.80	43.56
Pike	13.03	14.28	17.54	15.04	65.80	19.79	18.36	66.50
Posey, Vanderburgh	13.94	17.25	20.55	21.86	68.43	21.79	23.08	67.45
Putnam	12.30	12.30	15.04	18.73	41.78	16.81	19.60	45.44
Sullivan	10.96	10.96	16.17	13.97	72.34	20.03	14.89	72.40
Vermillion	19.89	19.89	18.80	27.42	40.04	20.58	23.04	40.51
Vigo	10.25	10.25	16.48	16.14	--	19.41	17.15	--
Total	3.24	3.41	4.68	4.89	16.22	5.31	5.23	16.64
Knobs Unit								
Brown	4.87	7.83	9.65	8.87	36.47	10.16	8.87	37.78
Clark, Scott	6.65	6.65	10.07	10.92	45.97	10.82	11.82	49.83
Crawford	5.94	5.68	7.40	8.15	28.80	9.28	10.17	28.89
Dubois	8.96	8.96	12.14	14.98	67.13	13.65	15.94	68.67
Floyd, Harrison	9.18	9.18	11.58	12.28	48.11	13.29	13.49	55.83
Jackson	5.86	6.21	9.58	12.08	46.18	11.21	14.20	48.60
Lawrence	7.60	8.19	11.10	10.70	36.76	12.46	11.87	36.61
Monroe	5.53	6.45	11.45	9.19	60.62	14.33	10.55	61.41
Morgan	8.85	8.85	12.25	11.87	63.73	14.10	14.39	68.07
Orange	4.25	4.25	8.02	8.72	35.02	10.06	8.77	35.21
Owen	8.18	8.30	10.63	10.93	37.38	12.22	11.64	38.39
Perry	5.11	5.11	7.23	6.97	34.30	8.81	7.38	37.32
Spencer	13.56	16.45	20.26	20.40	41.45	23.09	20.74	40.93
Warrick	13.43	13.43	16.69	18.44	55.19	19.03	21.03	59.19
Washington	6.41	6.41	10.04	9.20	31.42	11.19	9.83	30.92
Total	2.04	2.09	2.86	2.88	12.31	3.29	3.12	12.83
Upland Flats Unit								
Dearborn	11.06	11.06	17.82	18.04	--	22.60	22.13	--
Fayette, Union	20.80	22.58	31.68	36.88	68.22	32.45	35.69	72.00
Franklin	4.58	6.74	11.42	15.30	57.49	13.77	16.98	67.71
Jennings	10.75	10.75	13.55	16.75	44.13	14.44	16.74	44.36
Jefferson	10.91	11.45	16.72	14.80	76.66	19.56	18.44	85.69
Ohio, Switzerland	6.32	6.32	16.15	14.72	83.91	23.63	21.69	--
Ripley	10.87	12.81	15.60	19.61	65.15	18.00	22.95	70.49
Total	3.87	4.13	6.48	7.13	25.36	7.64	8.42	27.72

(Table 56 continued on next page)

(Table 56 continued)

Forest Survey Unit and county	Forest Area	Timberland Area	Growing stock Volume	Growing stock Average annual net growth	Growing stock Average annual removals	Sawtimber Volume	Sawtimber Average annual net growth	Sawtimber Average annual removals
Northern Unit								
AdHuWe	17.22	17.85	18.64	19.27	74.80	22.57	24.18	74.22
Allen	16.24	18.12	22.58	23.43	--	24.60	23.91	--
Bartholome	18.77	18.77	23.00	23.22	--	24.22	23.64	--
BeFoWa	15.56	15.56	21.05	29.82	--	21.96	31.82	--
BlDeGrMa	17.44	17.44	22.73	24.02	83.25	25.84	26.06	--
BoClHaTi	25.34	27.69	37.64	37.91	--	41.64	39.02	--
CaTiWh	13.55	13.55	17.90	19.70	81.31	18.90	19.66	81.35
CaHoMiWa	14.88	14.88	19.30	20.22	40.47	21.19	22.49	45.08
DeHeRuWa	14.42	14.42	17.07	19.59	66.75	17.03	17.97	69.01
Dekalb, Steuben	17.67	17.67	25.69	22.10	78.33	31.72	26.57	--
ElNoWh	15.05	15.68	18.44	19.96	38.54	19.30	19.97	40.04
Fulton, Marshall	24.18	24.18	32.41	30.86	--	35.00	31.65	--
HaHeJoMaSh	15.34	16.91	24.82	22.37	57.88	26.93	23.23	58.45
Jay, Randolph	14.64	14.64	27.42	23.34	70.07	37.61	34.32	75.38
JaLaNe	20.31	20.77	30.60	26.51	--	40.26	31.61	--
Kosciusko	21.27	21.27	27.56	30.64	--	31.02	33.64	--
Lagrange	21.65	21.65	32.47	38.29	66.75	34.58	46.52	66.75
La Porte	14.33	15.70	24.88	25.13	--	28.82	27.43	--
Montgomery	15.75	16.29	28.99	29.29	77.04	35.28	34.31	83.39
Porter	14.98	21.67	38.45	24.68	--	45.11	30.56	--
PuStSt	11.76	12.69	20.88	26.85	58.61	24.14	30.21	68.40
Total	3.58	3.79	5.28	5.55	18.24	5.93	6.10	19.86
All counties	1.52	1.59	2.18	2.36	8.27	2.47	2.53	8.73

[1] Sampling error is not calculated when the estimated removals are equal to 0.
AdHuWe = Adams, Huntington and Wells Counties.
BeFoWa = Benton, Fountain and Warren Counties.
BlDeGrMa = Blackford, Delaware, Grant and Madison Counties.
BoClHaTi = Boone, Clinton, Hamilton and Tipton Counties.
CaTiWh = Carroll, Tippecanoe and White Counties.
CaHoMiWa = Cass, Howard, Miami and Wabash Counties.
DeHeRuWa = Decatur, Henry, Rush and Wayne Counties.
ElNoWh = Elkart, Noble and Whitley Counties.
HaHeJoMaSh = Hancock, Hendricks, Johnson, Marion and Shelby Counties.
JaLaNe = Jasper, Lake and Newton Counties.
PuStSt = Pulaski, St. Joseph and Starke Counties.

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Schmidt, Thomas L.; Hansen, Mark H.; Solomakos, James A. 2000. **Indiana's Forests in 1998**. Resour. Bull. NC–196. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Research Station. 139 p.

The fourth inventory of Indiana's forests reports 23 million acres of land, of which 4.5 million acres are forested. This bulletin contains detailed tables of area, volume, growth, removals, mortality, ownership, and other resource attributes.

KEY WORDS: Forest area, timber volume, net growth, removals, mortality.